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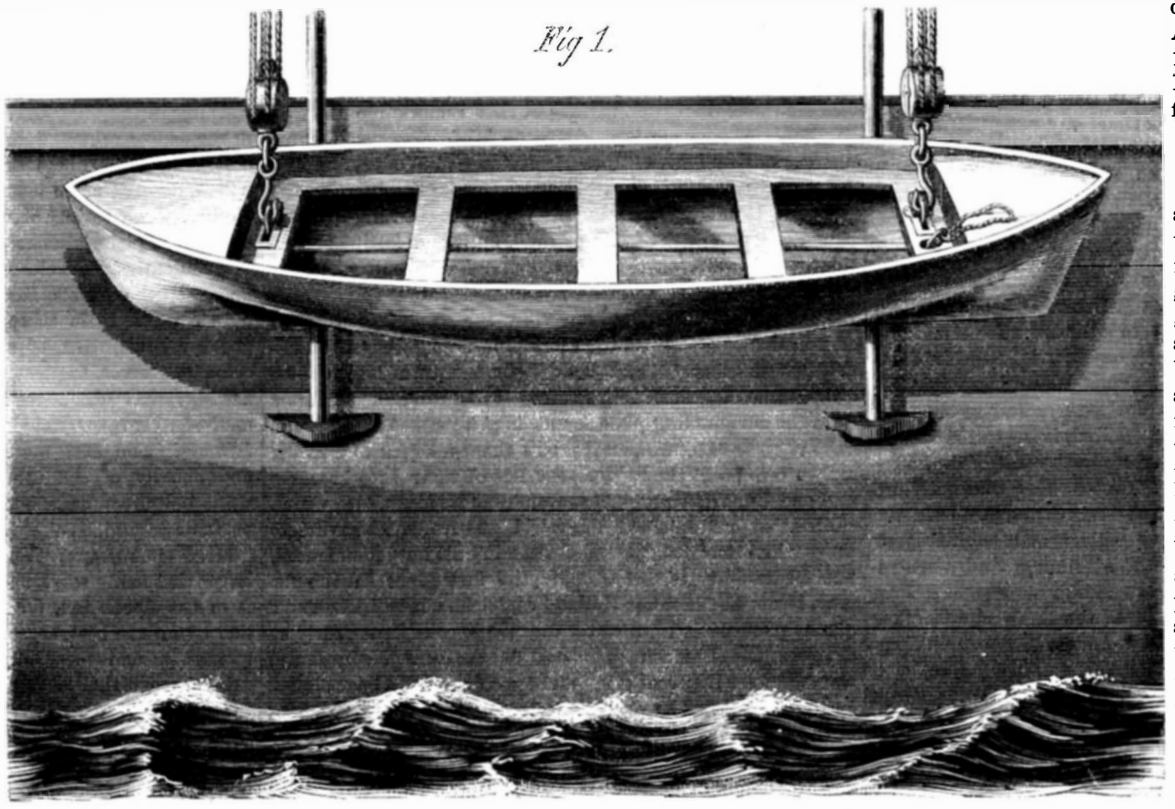
Excelsior Detaching Apparatus.

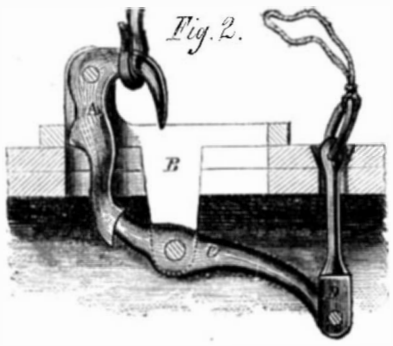
The many disasters at sea, the fatality of which is increased by the accidents attending the lowering of boats from vessels, and the law of Congress approved July 25, 1865, have greatly stimulated invention in the effort to guard against such catastrophes by improved means of safely launching boats.

The law to which we refer provides that "all sea-going vessels carrying passengers, and those navigating any of the northern and north-western lakes, shall have the life boats required by law, provided with suitable boat-disengaging apparatus, so arranged as to allow such boats to be safely launched with their complements of passengers, while such vessels are under speed or otherwise, and so as to allow such disengaging apparatus to be operated by one person disengaging both ends of the boat simultaneously from the tackles by which it may be lowered to the water."

Fig. 1 shows a boat slung to the davits of a ship and having the apparatus attached. Fig. 2 shows one of the hooks, the trip, and the releasing lever. The hook, A, is of metal, pivoted to a slotted plate secured to a fixed thwart or other cross piece near the end of the boat. The slot in the plate allows the lower part of the hook to swing up through, completely reversing the position of the hook. When the boat is suspended the point of the hook projects below the upper surface of the plate, B, forming a loop so that the davit tackle cannot be accidentally unfastened, and the hook is held in place by the weight of the boat, that presses its lower end against the trip lever, C, which is pivoted to a downward projecting lug on the plate, B. The form of the end of the trip lever and its corresponding seat on the end of the hook is of such a shape that no great effort is required to detach them, as the ends are formed on the radius of a circle struck from the pivot of the trip as a center. The boat is released by a slight pull upon the releasing arm, D, pivoted to the long arm of the trip. To insure the simultaneous release of both ends of the boat, a bar runs from one to the other of the trips under the thwarts, as seen in Fig. 1. This bar forms the pivots to which the trips, C, are rigidly secured, and as the arm, D, is raised at one end of the boat, the trips at each end are released at the same time, allowing the hooks, A, to reverse instantly. The arm, D, is not necessarily used at each end of the boat; preferably it is placed only at the stern to be under the exclusive control of the officer of the boat. The hooks after being used return at once to place, so that the apparatus is again ready for use in hoisting the boat.



HUNTINGTON'S BOAT-DETACHING APPARATUS.

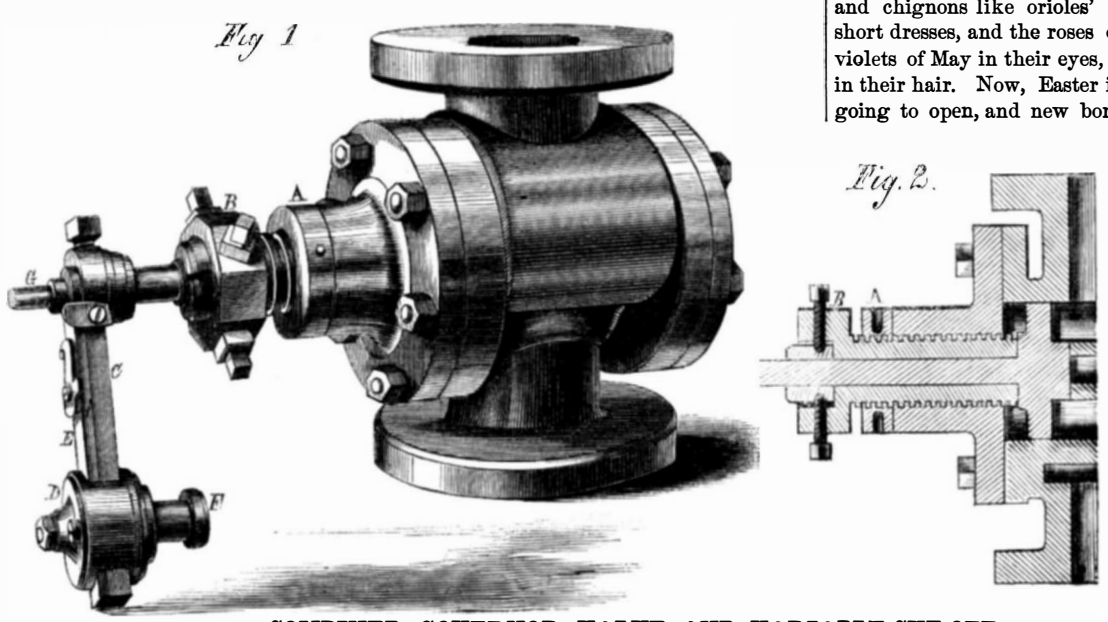


This apparatus is the invention of Thomas Huntington, of New Rochelle, N. Y., and was patented through the Scientific American Patent Agency April 17, 1866, and January 15, 1867. For further information apply to Thomas Huntington, at T. Davids & Co., 127 and 129 William street, New York City.

Improved Cut-off Valve.

This arrangement of the cut-off and the governor valve in combination has some elements of excellence not seen in others which are intended to produce the same results. By face of the valve case or chamber. The valve is adjusted by the jam nut, A, Fig. 1. On the screw follower is a thimble-oqx, B, which carries a split sleeve, or a collar in three or four sections, which can be adjusted by means of set screws in the thimble-box to hold the valve stem in position. It will be seen that no packing is required for the valve stem, as the screw follower, jam nut, and thimble-bearing fit sufficiently close to prevent the escape of steam.

On the end of the valve stem is secured an arm, C, having a similar arm parallel to it, the two kept in their relative positions by the box, D, which is secured to the arm, E, and joint and by a latch on the lower portion of E, engaging with a pin on the upper portion. On this latch is a projection that in case of the breaking or running off of the governor belt, will, by the sudden raising of E, be brought in contact with a catch or stop on the upper part of C, and thus liberate the lower part of E, together with the box, D, which will drop to the extreme end of C, and either stop the supply of steam by closing the valve or diminish the supply to a perfectly safe point, as it may have been adjusted to do.



DICKINSON'S COMBINED GOVERNOR VALVE AND VARIABLE CUT-OFF.

slides on the arm, C. The wrist, F, on box, D, receives the hook of the eccentric rod, and that seen at G on the arm, E. takes the rod from the governor.

It will be seen that when by increased speed the governor balls fly out, the arm, E, and with it the box, D, slide toward the end of the bar, C, giving increased leverage and consequently diminishing the movement of the valve by the throw of the eccentric and decreasing the amount of steam admitted to the cylinder, while the contrary action takes place when the balls describe a smaller circle in a lower plane by decreased speed. The bar, E, is in two parts, connected by a V-chanelled

A patent was secured for this device through the Scientific American Patent Agency Nov. 13, 1866, by J. L. Dickinson, of Dubuque, Iowa, whom address for further information.

Now.

Now, fields are being plowed, and early potatoes planted, and windows are left open in the middle of the day, and people go out in slippers to watch the gardener's progress, and coughs abound, and the doctors are busy. Now, Chaucer is read; and Milton's L'Allegro, and more poetry than ever, is sent to the magazines and newspapers. Now, the fat, saucy robins hop about over the newly turned up ground, and the bluebirds glance from tree to tree, and the wild ducks glide in a pretty procession on the river; and the crows squabble in the woods, and, walking among the cedars, you send the whirring crowds of yellow wing-tipped cedar birds flying before you at every step. Now, the bird fanciers thrive, and enthusiastic boys buy pigeons—pouters and fan tails—and the girls get canaries, and even mocking birds find credulous purchasers who fondly believe they can sing. Now, the hardware shops take in their coal scuttles, and door mats, and skates, and sleds, and put out refrigerators and bathing tubs, and rakes, and hoes. Now, strawberries grown in hot houses, with the flavor of cold potatoes, appear at the stylish restaurants, and are bought by over rich people at twenty-five cents a piece; and young women of a credulous turn of mind buy rose bushes in the city markets, full of buds, and believe they will open, and the first shad is sold for five dollars and goes to the gridiron.

Now, the dear female sex comes out as one man in little round hats with pigeon wings, and their brother's jackets, and chignons like orioles' nests, and the tidiest, prettiest short dresses, and the roses of June in their cheeks, and the violets of May in their eyes, and the gold of the sun himself in their hair. Now, Easter is coming, and the milliners are going to open, and new bonnets are to be bought, and organdies appear in the windows, and the sun will dance with joy at the beauty of the new fashions, and the inventiveness of the female mind will strike everybody for the thousandth time. Now, all the boys and girls are flying kites, excepting those who are playing marbles, and Mr. Van Tine is asked a hundred times a day, "How much for them Japanese kites?" as the kites grin like demons when the poor little shavers with ten cents are told that the kites are forty. Now, all the boys are dying for fish hooks, and cord, and sinkers, and bobbers, and the fish are uneasy in their minds, which they wouldn't be if they knew anything about boys.

Now, plans are formed, and the winter is abused behind his back, and a good peach crop is anticipated, and the papers are full of stories of the profit people made last year off a half acre of strawberries and grapes. Now, rents are raised, and house hunters are aghast, and painters are busy, or pretend to be, and carpenters have no time for immediate calls, and servants in the city are looking out for places in the country, and hod carriers develop a preternatural and unsuspected talent for gardening and the care of horses. Now, spring has come, and winter has gone, and the heart is renewed, and life is quickened, and under the blue sky nothing seems

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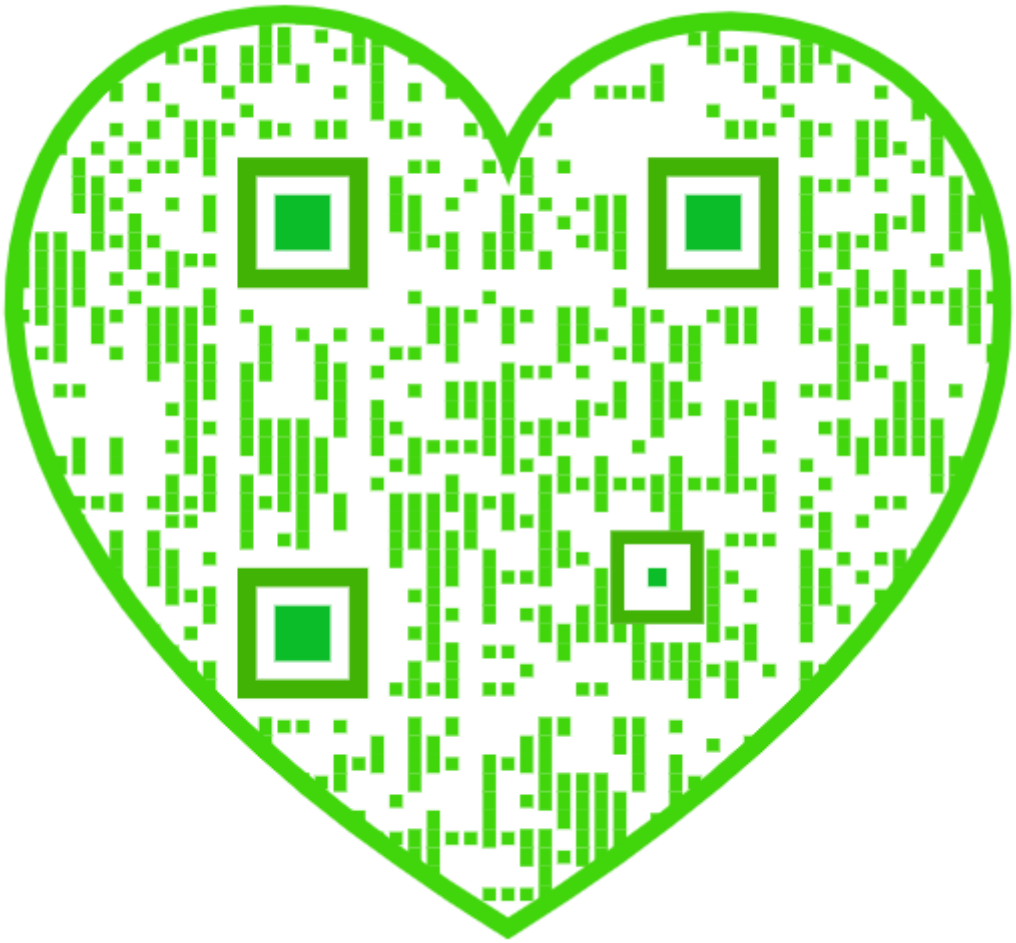

so fit for the day as love making, and all young things, from babies to goslings, are in season, and the faces of the sick are sadder than yesterday, and the sight of a little lame child makes the tears rush to the eyes—and that death should be here in the very bursting and fullness of life, is more than ever a dread and a mystery.—*The Nation.*

[From our Foreign Correspondent.]

THE PARIS EXPOSITION---AS IT OPENED.

PARIS, April, 2. 1867.

AN EMPEROR ON EXHIBITION.

In accordance with the original determination the formal opening of the Great Exhibition took place at P. M. The unintermitted labors of all those concerned in the matter had succeeded in bringing a fair show of order out of the chaos which previously reigned and still exists, to a considerable extent, and the event was not such a farce as many had prepredicted it must be. Wisely, however, the more imposing ceremony was deferred till a later date, probably the day on which the prizes will be awarded to the exhibitors; that which took place yesterday being of the simplest character. The weather was most propitious, and the thoroughfares along which the imperial party were to pass, were densely filled with people though it seemed to me there was little to reward them for their trouble, as there was no military display, except of course the guards stationed along the route (a sight too familiar in Paris to attract any attention) and as the Emperor does not at any time seclude himself from the public, it is hard to see what was the attraction on this occasion. At all events, the crowd was not compelled to wait beyond the time appointed, for promptly at the hour the Emperor and Empress with their suite entered the Grande Porte and were received by the Commissioners. The price of admission to the public was fixed at 20 francs, and many availed themselves of the opportunity to witness the ceremony. Whether they were repaid or not, each must judge for himself, but as none were allowed to walk about, but when admitted were confined to a single locality, and as the view from any one point is extremely limited, it is certain that as far as the sight of the Imperial party was concerned, the enjoyment was exceedingly brief. On entering the building, the party ascended the stairs to the raised promenade in the center of the outer or machinery gallery, and beginning at the French side made the tour of the building, and were received with cheers as they passed along. Descending from this they passed through portions of the fine arts and other galleries, and at various points were saluted by the Commissioners from the different countries, and the jurors, who were arranged in groups at different portions of the building. This was the whole of the ceremony, and at the close of it the party drove off by the same entrance at which they had arrived. The avenue from the entrance of the park to that of the building was covered over with the rich Imperial green cloth, gold flies hung from a row of masts on each side, from the top of which waved banners of many colors, presenting a very gay appearance.

Most of the machinery was in operation, steam having been got up for the first time in the English department on Sunday, and altogether the affair was a tolerable success. To day the Exhibition is open to the public at 5 francs admission which it is understood will be the price during this week, after which it will be reduced to 1 franc.

STATE OF THE AMERICAN DEPARTMENT.

Except in the machinery department, which must be nearly complete, it would seem that hardly more than half the articles are in place. The American department is particularly empty, except in the picture gallery. This latter bids fair to the most creditable portion of the Exhibition for us. There are Church's Niagara, Weir's Casting of a Parrot Gun, and Bierstadt's Rocky Mountains, besides a number of other good pictures; but of course some pieces of inferior merit detract from the excellence of the collection. As a whole, the display of paintings promises to be one of unusual interest. In the machinery department the Americans are also rather behind hand. There is a Corliss engine just beginning to be erected, which will doubtless do us credit when it is in operation, a good display of tools by Messrs. Wm. Sellers & Co., and Messrs. Bement & Dougherty and others, and a number of pumps and miscellaneous machines, but as far as I have observed nothing is yet in operation. The locomotive sent by the Grant Locomotive Works, Paterson, is placed in the United States Annex outside of the main building and attracts a great deal of attention from its extraordinary appearance, the boiler being cased with German silver instead of the usual Russia iron, and the chimney made of the same material. It is to be regretted that the makers saw fit to send it in this fashion, as our locomotives are already showy enough without any additional embellishment, and no doubt the real merits of the machine will not be as carefully studied by the majority as if the engine came in a more business-like dress. For those, however, who will examine it, there is nothing to be ashamed of in this engine, and in many points it undoubtedly excels any locomotive in the Exhibition, though I fear that will not be the general verdict. The same remark that I have made with regard to this engine applies to almost all the other American machinery exhibited. Fancy painting seems to be thought a necessary qualification for an exhibited article, while all the foreign machinery is painted in perfectly plain colors; generally lead color or some similar hue; and there can be no doubt that the effect is much more pleasing. Our best makers, however, are an exception to the rule, and show the good taste which we ought to expect from them.

In the other American departments there is as yet almost nothing. Tiffany exhibits a case of very chaste silver plate, with a model of the Vanderbilt also in silver and very neatly done. There is a good display of samples of petroleum oils by Pease, of Buffalo, and some pianos and other articles which are at present covered up; but aside from these there is only emptiness, though no doubt we shall have a better account to give of ourselves shortly. The Norwegian and Swedish department appears to be as nearly complete as any, and presents a very handsome appearance. There is, naturally enough, great difference in the taste with which the departments of the various nations are decorated, and neither ours nor the British will take the first rank in this respect.

The grounds are rapidly progressing toward completion, and now need as much as anything, a week or two of warm sunshine to make them exceedingly beautiful. The amount of work that has been accomplished is an example of the expedition with which the French can carry on such undertakings. On the 25th of Sept. 1865, the Champs de Mars, then a bare parade ground, was delivered over to the Commissioners. On the 3d of April 1866 the first column of the iron building was raised, and just one year from that date the exhibition is opened.

SLADE.

An Old "Black Country" Town.

Wednesbury is one of the most important links in the clustering chain of towns and villages, familiarly termed the "Black Country," and is associated alike with the strange traditions and varied industries of this remarkable district. In the Doomsday Book it is written *Wodensborough*, a name unquestionably derived from the Saxon god Woden, and it is reasonably conjectured that, in more remote times, it was the site of a Druid temple. In the year 916 the fair Princess Ethelfleda, daughter of King Alfred, built and fortified a castle here, to ward off the troublesome Danes, one of whose valiant "sea kings" cast ever and anon a jealous eye towards the kingdom of Mercia. Early in the twelfth century a church was erected upon the crumbling foundations of Ethelfleda's ancient castle, and henceforth the town began to acquire some degree of importance. Villaines and borderers from the surrounding plain found here a market for the produce of their carncates, and proud thanes began to discover and turn to profit the hidden treasures of their broad acres—coal and lime, and ore—those wondrous weapons with which civilization has subdued the world. There is no record to prove when the development of the minerals here commenced, but Wednesbury is, undoubtedly, the first place in the district, if not in the entire Midland coal-field, where, in Leland's quaint phraseology, "men did dig for secoles," As early as the year 1315, Bradeswall, a small hamlet near Wednesbury, was noted for its "coal pits," and appears to have been almost entirely populated by primitive miners. Leland and Camden, in the account of their "surveys," both bear testimony to the increasing development of the coal mining of Wednesbury during the sixteenth century. The latter quaintly expresses his doubt about the propriety of disturbing this mineral wealth. "Wednesbury," he writes, "hath coles digged out of the earth and mines of iron, but whether to their commodity or hindrance, I leave to the inhabitants who better under stand it." In the days of Queen Bess the smelting of iron commenced in the neighborhood, but the blast furnaces were unable to produce more than fifteen or twenty tons of iron each per week. They were erected near a stream of water, in a part of the parish known as Broadwaters, and huge water-wheels were made to work the blast bellows. The smelting was all done by means of charcoal, and the wood "two miles in length by one in breadth," referred to in Doomsday Book, was soon stripped of every "gnarled and knotted oak," to supply the requisite fuel. Then came Fuller's lament about the loss of British timber, caused by the ironworks which were spreading all over the kingdom. Fuller was a true poet, and he saw more beauty in sylvan dells and shady forest bowers than the iron trade was ever likely to afford. His lament reached the ears of Parliament, and a Government interference stopped the supplies of wood, and threatened for a time the extinction of Britain's iron trade. In this dilemma up rose Dud Dudley, who, after much persecution and loss, proved the possibility of using with advantage coal as a fuel for iron making, and from that time the trade of the district has added, year by year, to its wonderful proportions.

At the time of the rebellion Wednesbury was a town of respectable importance. Its church, thrice re-built, was considerably beautified within and without. The little town beneath was busy with industrial life. Potters, nailers, delvers, weavers, forgemen, and bend-ware makers, were, even then, laying the foundation of its modern prosperity, and setting no mean example of skill in handicraft.

Another century rolled around, and steam power began to be applied to the fast increasing industries of Wednesbury. The first attempt to construct a colliery engine was made by Capt. Savary, in 1739, and, like all other "first attempts," it failed. But as succeeding efforts were put forth, and the difficulties were one by one surmounted, a great extension of enterprise took place, and a large population was attracted to the town. The character of these indnstrial inhabitants about the middle of the last century gave to the town an unenviable notoriety. All sorts of brutal pastimes were indulged in. Superstition was rampant among the toilers of that day, especially among the colliers, who saw in every chamber of the mine a gnome or a hobgoblin. This condition of affairs continued in a milder form until far into the present century, and the artisans of Wednesbury were not unfaithfully portrayed by Mr. Disraeli in "Sybil," about thirty years ago. About that time they commenced to throw aside the brutality and ignorance which at once uprooted their morals and fettered their skill, and every year since then has revealed a sure and steady advancement in their intelligence and ingenuity, and in the consequent prosperity and importance of the town. Modern Wednesbury contains Some 20,000 inhabitants, having nearly quadrupled its population within the past half century. The total number of artizans engaged in the skilled mechanical trades of Wednesbury exceeds 5,000.—*The Engineer.*

Cabinet Portraits Amid Snow and Ice Scenery.

We have recently noticed the admirable winter effects obtained by Mr. Notman, not only in pictorial photographic compositions, but in the backgrounds and accessories of his photographic portraits. A selection of cabinet portraits we received a day or two ago furnishes us with further variety of effect of this kind. We have here figures—ladies and gentlemen—skating in every variety of position and action belonging to this graceful exercise. Some are apparently gently gliding over the ice; others suggest the action of pulling up and arresting extreme velocity; whilst others are apparently flying along at a tremendous pace, poised on one leg, the other being raised ready to descend and give another forcible stroke. A lady, in a charming short-skirted skating costume, just raising one foot while she glides along on the other, is exceedingly graceful. In all these, the snowy background and the perfect effect of ice, secured in the studio, are most wonderful. The figures are partially reflected in the ice, the reflections broken, however, by the cracks or lines, or fissures, cut in every direction by the skates in the ice, and by the snow blown about here and there. Other figures are walking in the snow-covered scenes, their feet sinking deep in the snow; others, wearing huge snow shoes, tread lightly on the surface; others are breasting a pitiless snow storm, which, descending in heavy flakes, seems to half obscure the picture. The variety of winter costume is admirably suited to enhance pictorial effect and add interest to the photographs.

Much curiosity has been expressed as to the mode in which many of the effects have been produced with so much of nature and so little effect of contrivance. And here we find another illustration of an apothegm we never fail, when occasion serves, to press on the attention of our readers; namely, that excellence is due to the man rather than the method; that personal skill is of even more value than perfect formula. The best materials and the best processes are undoubtedly of the utmost value in securing good work; skill, judgment and taste in applying them are not less important.

Mr. Notman says; "To produce the effect of fallen snow, I have tried many ways, such as carded wool, white furs—that from the Arctic fox, for instance—but latterly salt, which I find by far the best, as you can throw it on and about stones, rocks, etc.; and it so easily takes any desired form—such as a drift. When thrown upon the figure, it adheres to the cloth; in fact, as a representative of snow, it leaves nothing to be desired.

"To represent falling snow: after the negative is dried and varnished, I take some Chinese white and mix it with water to the consistency that experience alone can dictate as best suited; put it into a vial, introduce one of those perfume blowers, and blow into the air a shower of the liquid Chinese white, and, as it falls, catch as much of it as is desirable on the varnished side of the negative: by judiciously holding the negative, you can so direct it as to give the effect of a slant to the falling snow.

"To represent ice, I use sheet zinc, over which I have polished plate glass. At first I was in hope that zinc of itself would be sufficient, but a short trial convinced me that the zinc required protection from the action of the salt, which I use to represent the snow on the banks at the side."—*Photographic News.*

A New Mineral from Borneo.

This mineral is found mixed with the native platinum brought from Borneo. It forms small grains or globules of a dark black-gray color, and of considerable luster. Many of these grains show brilliant crystalline facets, which are the faces of regular octahedra. The new mineral is very hard and brittle. Its powder is dark gray. Its density exceeds 6, according to an approximate determination. When heated it decrepitates like galena; it does not fuse before the blowpipe, but diffuses a strong odor of sulphurous acid, and then of osmic acid. It is not attacked by aqua regia, nor by bisulphate of potash. Fused in a silver crucible with hydrate of potash and nitre, it dissolves to a green mass. After cooling, the mass is brown, and it dissolves in water with a magnificent orange color. The solution has the odor of osmic acid, and nitric acid produces in it a black precipitate. From this it may be concluded that the new mineral contains as its principal elements osmium and ruthenium. It also contains sulphur. To estimate the latter I heated the mineral to redness in a current of hydrogen until no more sulphuretted hydrogen was disengaged. The residue was exhausted many times by aqua regia; there remained metallic ruthenium. A portion of this metal was estimated in the orange solution. This was evaporated, then neutralized by ammonia and brought to dryness, and the residue calcined in a covered crucible in an atmosphere of carbonate of ammonia. There remained metallic ruthenium. The osmium which volatilized was determined by difference. From this analysis the new mineral contains—

Sulphur	31·79
Ruthenium	65·18
Osmium	3·03
	100·00

These numbers appear to show that the mineral is sulphide of ruthenium, Ru_2S_3, twelve molecules of which are associated with one molecule of sulphide of osmium, OsS_4.—*F. Wöhler, in Chemical News.*

GLYCERIN affords an excellent coating for the interior of plaster molds.

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Editorial Summary.

CATCHING COLD, says Dr. Thomas Inman, is a common phrase for an attack of catarrh, but it is a very incorrect one. One year I suffered so very severely from a series of "colds" that my attention was drawn especially to them. I was then lecturer on Medicine, and nearly every night from five o'clock to six during the winter months, had to turn out from a warm room to go through all weathers, lecture for an hour in a theater heated by a stove and lighted by gas, and then return again to my snuggery at home. When I felt a fresh cold beginning, I tried in vain to account for it, until I accidentally saw in Copland's dictionary that the most fertile cause of a cold was coming from a moist, cold air to a hot and dry room. This at once explained to me the reason of my frequent suffering, for I had invariably gone into my hot room straight from the cold. I of course soon changed my habit: I dawdled in the hall while taking off my great coat, perambulated the rooms which had no fire in, went up and down stairs and the like, ere I went into my study, whose temperature was also reduced. Since then, I agree with a friend who says, "that a cold comes from catching hot;" and I am disposed to think that there is a strong analogy between a chilblain on a child's toes and a cold in a person's nose, throat, and lungs.—*Medical Mirror.*

ROCK CRUSHER.—Our miners have tried many things, but have found nothing equal to the percussion of the comparatively light and lively dropping stamp. They generally think that this principle cannot be equalled by that of pressure or of abrasion, in any shape, for breaking up ores. There are those, however, who hold a different opinion, and we have seen notices of a new pulverizer for copper rock (Mabb's) which is claimed in the north-west to crush a hundred tuns per day. The power required is not stated, and the information is therefore of little value. The machine resembles a linseed crusher on a large scale, consisting of four seven-tun wheels, with a six-inch face, traveling one after another in a channel or trough in a circle of thirty feet diameter, at the rate of 300 feet a minute. The power required for four seven-tun rollers, traveling a road of rough boulders, must be sufficient to run a great number of stamps; but we have no data for the proper comparison.

THE BROADWAY BRIDGE was opened to the public on the 15th of April for a single day, throughout which it was thronged with curious crowds, who lingered to enjoy the magnificent *coup d'œil* of architecture and swarming life, up and down the street. The top-heavy and shaky hand-rails toward Broadway have since been braced with outside brackets, and no longer threaten the crowds that press them with precipitation into the street. When the work of painting and decoration is completed, the much debated utility of the structure will be put to proof. Undoubtedly as a place to see, and perhaps to be seen, it will be popular, whether its more substantial benefits are sufficient to warrant the erection of similar structures in other quarters or not. In any event, it will remain while it is needed, a costly monument of the incapacity of our municipal institutions and their Albany stepmother together, to solve in twenty years of suffering the simple problem of a passable thoroughfare.

AMERICAN ORDNANCE.—It is much to be wished that the real power of the heavy 15-inch and 20-inch guns were understood in this country, instead of our believing so generally in their "low velocities." In the large chambers of these guns the powder gas has additional room for expansion, and, as would be the case with steam cut off at a small portion of the length of a large steam cylinder, it thus does more work. In reality, while the dynamic value of our cannon powder, for each pound weight, is but about 170,000 foot pounds, that of no better powder, fired in the large-bore American guns, is 200,000 foot pounds. Thus, the 15-inch gun, fired with 60 lbs. of powder and a 440-lb. shot, has an initial velocity of 1320 feet per second, a rate which would certainly not be considered slow by our own ordnance engineers. Our system of small bores and long shot not only strains our guns excessively, but loses us much of the useful effect of our powder.—*Engineering.*

IRON MOUNTAIN, Pilot Knob, Bogy and Shepherd Mountains, Missouri, with other iron hills of less magnitude, it is computed, would yield 1,000,000 tuns per annum of wrought iron for four hundred years. The depth and extent of the lead-bearing rocks are greater in this State than in any other portion of the globe. The same may be said of copper and iron ores. On the north and west of this great iron center are found lead, copper and zinc; on the south and east, copper, silver, argentiferous lead, nickel, cobalt, platinum and gold. The vast coal fields of Illinois are within a short distance, and will soon be brought by railroad into contact with these iron mountains, to melt them down and build from them eventually the greatest iron industry on the globe. Large manufacturing establishments have already been located prospectively in St. Louis, in view of the advantages of the Chester coal fields.

GREENLAND comes into notice once more, as the great source of the newly important metal aluminium. Cryolite, the mineral from which of all others it is most easily reduced, abounds in Greenland, and now supplies most of this metal to the arts. It is a fluoride of aluminium and soda, containing 24 per cent of the former, and is reduced by simply roasting, which deposits the metal in globules, aftewards separated from the fluoride of sodium by lixiviation. Soda is also manufactured from the cryolite at Copenhagen and other places in Europe.

PRINTS IN BITUMEN.—Mr. Swan has shown us a curiosity in carbon printing—prints produced in the following novel manner:—Paper was saturated with a solution of asphalt of such consistence that when dry no gloss appears on the paper. After exposure under a negative, an image was developed by means of turpentine, applied so that the soluble asphaltum shall find its way out of the paper from the side opposite to that exposed to light, so leaving the insoluble asphaltum to form a print with half tone. The same principle is, of course, applicable with chromo-gelatine printing; the material saturated with the chromo-gelatine being of an open texture (woven materials, for an example), and the coloring matter being of course soluble with the gelatine. Prints by Mr. Swan's processes are regularly published in Paris.—*Photographic News.*

MILITARY PROBLEMS IN ENGLAND.—The British Government are strongly urged by a late editorial in the *Mechanics' Magazine*, to take steps in emulation of the continental governments, to make an efficient defensive weapon of the torpedo. Capt. Harvey, R. N. who has devoted twenty years to the study of this subject, has recently offered to the Admiralty a plan of torpedo and torpedo vessel, the latter a sort of turretless monitor, with which he expects to be able to bring an explosion of any necessary force to bear upon the hull of a hostile ship approached in any direction. It appears that the British are behindhand also in the matter of repeating arms for cavalry, and Major Sir Henry Havelock, in a military argument just published, has endeavored to enlighten the public and the authorities, on this subject, by a detailed account of the battle of Five Forks, in which the decisive work was done by Sheridan's cavalry, armed with the Spencer repeating rifle, and acting both as cavalry and infantry.

REWARD OF HEROISM.—Mr. Parkin Jeffcock, the mining engineer who perished in a heroic attempt to discover and save those who were possibly left alive in the pit after the first of tha series of explosions in the Oaks Colliery, held a policy for £1,000 from the "Accidental Death Insurance Company." This company now refuses to pay over the money to the widow and orphans of the deceased, on the ground that he was guilty of "willful exposure," against which the policy stipulates expressly. Perhaps the defense is good: certainly public appreciation of it cannot fail to be the means of relieving them to a large amount from future risks of the kind. Other parties will show the same stone-blindness to their own interest as well as to all that is admirable in human conduct, if they neglect to make up promptly the provision refused to the family of this noble man.

WALL COLORING.—A new wash, said to be almost as durable as paint and well suited to plaster, wood, metal or brick, has been invented by Dr. Jacobsen of Hamburg. He dissolves 50 parts of glue in 150 parts hot water, with 2 parts of a solution of caustic soda, of specific gravity 1·34, and boils. After cooling, he adds 50 parts of commercial water glass solution, and then stirs in enough oxide of zinc to give a proper consistency for painting. Grind smooth in a paint mlll, if necessary. After the last coat has perfectly dried, a solution containing 10 per cent of chloride of zinc should be applied. This will give a beautiful gloss, and great durability. Earthy pigments not affected by alkalies may be used for color. The mixture must be applied quickly, as it will not keep.

IMPROVED AIR PUMP.—Mr. Regnault presented at a late meeting of the French Academy of Sciences, in the name of M. Deleuil, an excellent double-action, exhausting and condensing air pump, capable of making a remarkably perfect vacuum and of preserving it indefinitely, and of creating a pressure of 8 or 10 atmospheres. The piston is free and without packing, except a layer of air ·0008 of an inch in thickness and very long; the piston having a length equal to thrice its diameter. The heat disengaged is not appreciable, beyond that resulting from the compression of the air.

A NEUTRAL MAGNETIC CHAMBER.—Faraday has shown that if a small cubical space be enclosed by arranging square bar magnets, with their like poles in apposition, so as to form a chamber, within that space all local magnetism inferior in power to the magnets employed will be neutralized. The same effect may be obtained with electro-magnets as with permanent magnets, and it is proposed in the *Mechanics' Magazine* thus to enclose the compass of an iron ship, as a remedy for the deviation by local attraction. A battery might be constructed to be excited by the sea water flowing through it, requiring no attention as long as the zinc plates lasted.

TO BEAUTIFY THE TEETH.—Dissolve two ounces of borax in three pounds of boiling water, and before it is cold add one teaspoonful of the spirits of camphor, and bottle for use. A tablespoonful of this mixture, mixed with an equal quantity of tepid water, and applied daily with a soft brush, preserves and beautifies the teeth, extirpates all tartarous adhesion, arrests decay, induces a healthy action of the gums, and makes the teeth pearly white.—*Ex.*

THE METEORIC IRON sent by Marshal Bazaine to Paris from Mexico, has been assayed, with a specimen sent from North America, and both are reported to the Academy as remarkable for their white hue, softness and susceptibility of high polish—which is but a way of describing their chemical purity.

A LATE BOSTON NOTION is to generate steam with the aid of waste coal dust, very fine, injected by a current of compressed air into the space over the fire, where it burns with an intensely hot flame, and greatly increases the production of steam.

A HINT FOR PAPER-HANGING MAKERS.—We have a letter from a correspondent who is impressed, or as he says "stuck up," with the idea of gummed wall paper. Noticing that postage stamps as well as postmasters are gifted by their makers with the property of sticking to their places, he suggests that it would save trouble and be an economy if paper hangings had the same happy disposition beforehand. Much paper of this convenient description would be purchased and applied by small householders with their own hands, for which there is no demand with the present difficult and disagreeable way of hanging. The only objections that occur to us are the greater cost of glue or gum than of flour paste, and the inapplicability of the former to cheap unsized paper, which it fills and discolors. Possibly some inventor may devise a cheap sizing and soluble coating for common wall paper, which can be applied by machinery at trifling cost, so as to introduce a valuable new article of manufacture.

PHOTOGRAPHIC WALL PAPER AND CALICO PRINTING, seems to be the next thing coming. Mr. Dancer has been improving on the process of Mr. Mercer, the directions for which are as follows:—34 oz. of sulphate of iron is converted into peroxalate, diluted to 2 gallons, and will impregnate 200 square yards of paper. The paper having been floated on the solution until fully wet, is then exposed, and afterward steeped in some solution that acts only on the parts where the iron has been reduced from the peroxide to the protoxide. Red prussiate of potash and sulphuric acid act well, making the image blue and the ground white. Sulphocyanide of potassium and a salt of copper form another bath: the protoxide of the picture deoxidizes the copper, and the sulphocyanide of the suboxide of copper is fixed in the cambric or paper. This may be converted into the red prussiate of copper. A beautiful variety of colors may be obtained by substituting iodides, chromates, prussiates and oxides of other metals for those of iron or copper, and with these bases may also be used various dyes.

THE CUNARD STEAMSHIP "RUSSIA" is the forty-fourth screw steamer which has been built for the Cunard company; commencing with the Australian, in 1847. Of screw and paddle steamers this company has owned, from first to last, about 136, with an aggregate of 120,000 tuns and about 35,000 horse-power. The *Russia* is the largest screw steamer afloat, with the exception of the *Great Eastern*, and except the *Scotia* and *Persia*, the largest vessel in the Cunard fleet. She is 346 feet in length of keel and fore rake, 42 feet 6 inches breadth of beam, 29 feet 2 inches depth, 3,141 tuns. She has eight water-tight bulkheads, with water-tight doors which can be opened or shut from the spar deck. The engines are direct-acting inverted cylinders, of 86 feet diameter, 3 feet 9 inches stroke, and 650 horse-power nominal. She is designed for the line between New York and Liverpool, but will not be quite ready until June.

CHINA GREEN, or Lo-kao, has been produced by Mr. Charvin from the *Rhamnus Catharticus*, forming as beautiful a dye as the original of the same name. The process allows the article to be afforded for $8 90 per pound, and is as follows: Two pounds of the bark is placed in a kettle of boiling water; in a few minutes a pink scum is produced, when the whole is placed in an earthen jug well covered, until the next day. The liquid, now yellowish, is turned reddish brown by the addition of lime water, and is then distributed in glass jars, very little in each, and thus exposed to air and light, when it takes a green shade. This becomes gradually more general, and the whole is mixed together and carbonate of potash is added, producing a green precipitate, which is finally collected and dried.

IMPROVEMENT IN WEAVING.—The sewing machine is likely to have a rival in an invention recently perfected by which wearing apparel of all kinds, shirts, pantaloons, vests, skirts, ladies' mantles, jackets, coats, etc., etc., are both woven and sewed at the same time. The sewing of the seams is stronger even than hand sewing and perfectly smooth and even, and the articles are woven and sewed of any pattern, of wool, silk, cotton, or any other material.

HORSLEY'S TORPEDO POWDER is a compound of chlorate of potassa and nut galls, in the proportion of three to one by weight; ground and sifted separately to fine powder, and afterward intimately blended by passing together through a series of fine horse-hair sieves arranged one above another. If treated with care and not brought in contact with combustibles, it is not particularly dangerous, and is of nearly three times the strength of the best gunpowder.

THE SEWERS OF PARIS have an aggregate length of 294 miles. They are kept clean by means of boats—or in the smaller sewers, cars on rails—armed in front with a disk which fits the sewer like a piston; the whole being propelled through the sewer by a current of water.

A LIGHTNING CONDUCTOR, on the lighthouse at Fecamp, proved useless against a thunder-stroke, in consequence of being terminated in a cistern of water, lined with Portland cement.

M. GALLOS, director of the observatory at Breslau, has determined the identity of the orbit of one of the swarms of shooting stars of April, of which the radiant point is well defined, with that of the comet of 1861.

BLEACHING OF GUMS.—Mucilage, says Picciotto, may be completely decolorized by means of recently precipitated gelatinous alumina, which fixes the color on itself and leaves a clear solution.

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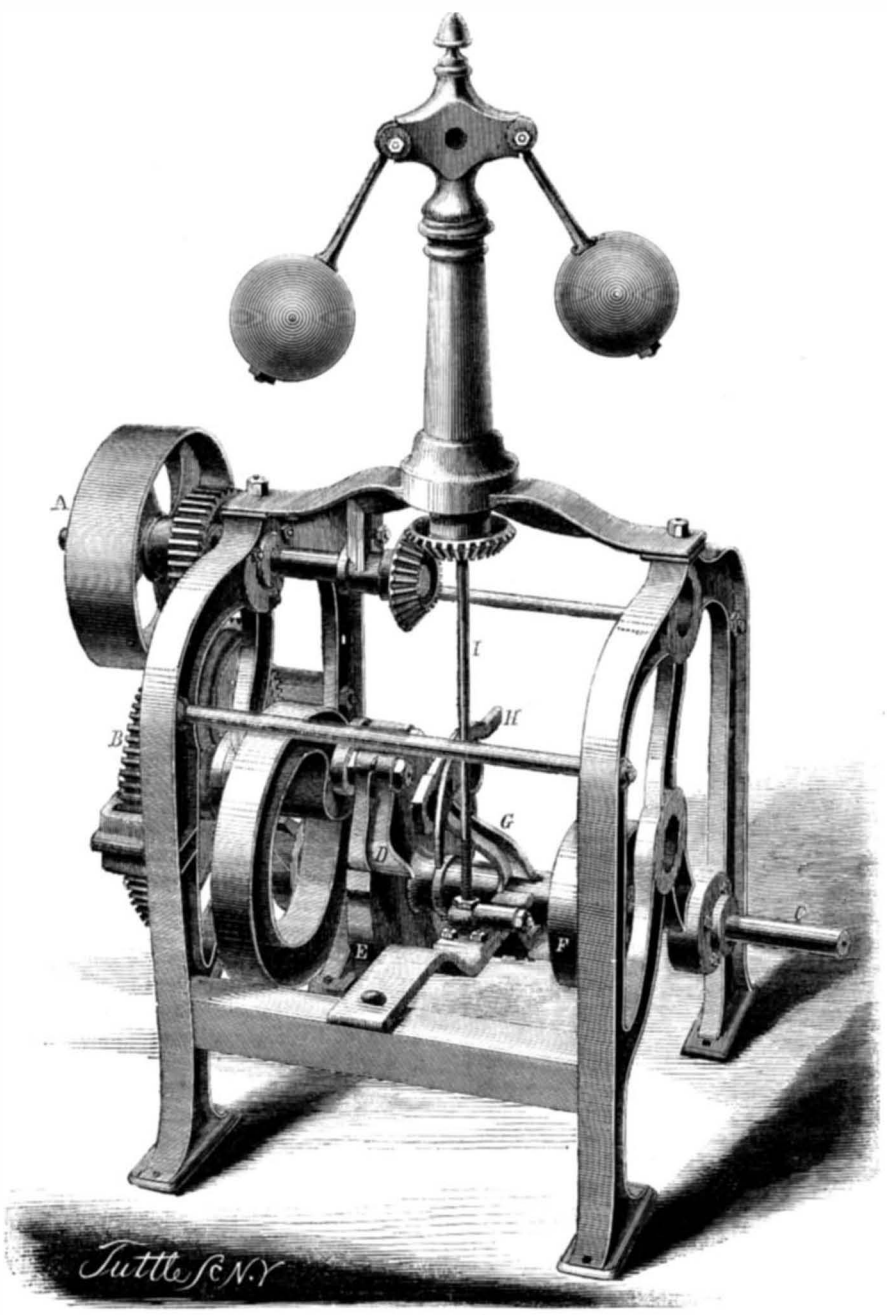
Kelley's Water Wheel Governor.

This is a simple arrangement of a ratchet wheel and double pawls by which the gate of a pentstock can be lowered or raised to regulate the speed of the wheel. The machinery is mounted in an iron frame of appropriate form, surmounted by an ordinary ball governor, which is driven by a belt upon the pulley, A, through the medium of bevel gears. A small gear on the pulley shaft drives a larger one, B, the other end of the shaft of which carries an eccentric cam. This cam, by means of a traversing roller on the end of an arm swinging loosely on the lower shaft, C, gives a vibrating motion to two pawls, one seen at D, which are pivoted to the vibrating arm. These pawls point in opposite directions and engage with dovetail shaped teeth on the ratchet wheel, E, which is secured to the shaft, C, that in turn is connected by belt, chain, or other suitable means with the water gate ; in the engraving a pulley, F being shown for this purpose. It will be seen that if one of the pawls, D, engage with the ratchet, E, the shaft, C, and pulley, F, will be turned by degrees in one direction, while the engagement of the other pawl will rotate them in the other. It is necessary there fore that when one is engaged the other shall be lifted clear of the ratchet teeth. This is secured by the movement of an arm, G, which turns loosely on the shaft, C, and carries at its upper end two weighted shoes, H, which when carried beyond a certain point elevate one or the other of the pawls, D, and thus prevent the raised one from acting on the ratchet. To a short projection of the arm, G, standing at right angles in a horizontal position, the rod, I, of the governor is attached by passing through a swivel stud, and adjusted by nuts, one above and the other below.

If the balls fly out in consequence of increased speed, the rod, I, is depressed, one of the shoes lifts one of the pawls and allows the other to engage with the ratchet, turning the shaft, C, and closing the gate. In case the balls are depressed by two slow a speed the reverse action takes place. When the water wheel runs at the speed desired and for which the nuts on rod, I, are adjusted, neither of the pawls can engage with the wheel and the gate shaft is held stationary.

This improvement was patented through the Scientific American Patent Agency, March 12, 1867 by Oliver D. Kelley. For other particulars address Lamb, Cook, & Co., Providence, R. I.



KELLEY'S WATER WHEEL GOVERNOR.

Obituary.

We have to record the death of Captain John Norton, which occurred last month at Bray, in Ireland. Captain Norton was, for many years, a contributor to the *Mechanics' Magazine* on matters of gunnery, etc. He invented many improvements in rifles and projectiles. We believe him to have been the original inventor of the bullet now used with the Enfield rifle, and known as the Minie bul let, and for which Minie received the Government premium.—*Mechanics' Magazine.*

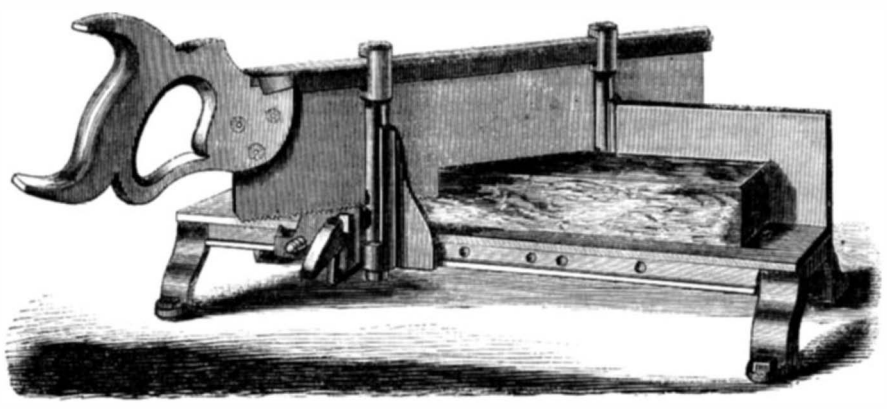
Our readers will remember Captain Norton as a frequent contributor to the columns of the SCIENTIFIC AMERICAN. He was one of those ingenious but luckless inventors whose golden thoughts for some reason or other are coined by others than themselves, and prove afterward hard to identify successfully and recover. It has thus become impossible to estimate accurately what unpaid and unpayable debt we must owe to the departed.—EDS. SCI. AM.

Improved Miter Box.

Workers in wood are continually annoyed by the disarrangement and unreliableness of the common and temporary miter box; the engraving shows one of more durable material than wood, one which cannot warp or wear. It is made entirely of iron, yet by a simple arrangement of the parts the saw's teeth never come in contact with the metal. It will saw four, six, and eight square, and at any angle, from 45° to 90°, the work always being done with perfect accuracy, requiring no paring of joints with plane or chisel, as is so often the case with that done with the common wooden box.

The saw passes through two upright guides, that at the back capable only of being lifted to accommodate the thickness of the piece to be sawed, and also of turning to guide the saw at any angle, while the front one in addition turns in a sliding clamp which can be secured at any required point by a dowel pin and a thumb screw. The box is planed, both floor and back, so that it is perfect. The saw is sustained in the guides by its back so that under all circumstances the teeth are kept clear of the iron.

This device will recommend itself to all practical workers in wood as durable and exact. It was patented Nov. 24, 1864. For machines or information address William H. Todd, agent for the Langdon Miter Box Company, Northampton, Mass



LANGDON'S MITER BOX.

Iron at Paris.

We glean a few notes of interest from *Engineering* relative to iron and steel manufactures in the Paris Exposition. Dietrich & Co., of Niederbronn, in Alsace, exhibit as specimens of mere iron and workmanship, a set of cast iron rings five feet in diameter, but only one twelfth of an inch thick and three eighths of an inch wide. They are cast entire, of a diameter of one ninth of an inch, and reduced by finishing on all their surfaces to the dimensions named. Messrs. Dietrich & Co. are also inventors of a peculiar solution for coating iron, which is insoluble in water and prevents oxidation. Theyexhibit a wrought locomotive wheel forged entire in one piece, including crank, counterweight and twenty-two spokes. Another company (the Societé Anonyme) exhibit disk wheels forged entire without a weld, out of a single bloom. Taylor Brothers, of Leeds, show a large spur wheel, four feet in diameter, cast of crucible steel, with teeth and arms all in one piece. Krupp exhibits an ingot of steel, of forty tuns weight, which is remarkable not from any known or necessary peculiarity of skill in producing it, but only as requiring bulkier apparatus than have yet been used by other manufacturers. *Engineering* reiterates the not very strange statement that Krupp's efforts in monster guns have not yet been successful : only the smaller steel guns having given fully satisfactory results. The firing of his great exhibition gun will decide more than its weight or measurement has done. He shows a mar ge shaft of steel, with double cranks, turned and finished all over, without a flaw or speck in its entire surface. Another Prussian steel worker, Berger, of Witten, is spoken of as fully equal in his line to Krupp. His reputation has been raised very high by the production of steel gun barrels for the Prussian army, their needle-gun barrels having been nearly all made by him, in solid blanks, and drilled. The remarkable uniformity of his material is shown by this, as ordinary inequalities would turn the drill out of line and ruin the weapon. Among the chilled car wheels of the Royal Works of Wurtemberg, at Königsbrunn, one is shown having a solid Bessemer steel shaft in its center, the iron having been cast around it. The steel shaft is heated and inserted in the chill like a core, and the iron, when run in, shrinks around the shaft, to which it be comes perfectly united.

Pisciculture.

The artificial propagation and rearing of fish is one of the most interesting and in many situations one of the easiest and most profitable kinds of husbandry. Experience has rendered it as simple a thing as hatching fowls, and will yet render it, wherever water is available, as common. The pursuit has spread considerably in this country, both among amateurs and economists, particularly in Massachusetts, as our readers are aware.

The improvement effected by human aid in the preservation of the eggs and multiplication of their actual product, is one of the most striking results of man's interference with animal nature. It is supposed that under natural conditions not more than one egg in five thousand of the spawn of fishes ever comes to maturity. But the *Canada Farmer* informs us that a gentleman of the "Dominion" has obtained from four female salmon, captured last fall in a small stream that empties into Lake Ontario, a progeny of no less than from 20,000 to 30,000 young salmon, which are doing finely. As to the parents, indeed, this is doing rather better than could be expected. Any kind of fish can be thus propagated, by following plain instructions with tolerable care. All that is needed is a safe receptacle or tank, or series of such, through which a pure current (filtered if necessary) is made to pass constantly, but so gently as not to disturb the eggs in the bottom. It should be protected from light by opaque sides and a perforated cover. The principal care and science are required in obtaining and impregnating the eggs, which must be done from the adult fish at the proper season and in a particular manner, described in such works as Buckland on "Fish-hatching."

A species of aquarium by far surpassing any other in curious interest may be maintained within doors by any one who can command a constant stream of pure water as large as a straw. The most satisfactory arrangement for observing the process of development in the eggs is to place them on a sort of raft of glass rods fixed in a frame of wood, fitting the interior of the tank, and just submerged beneath the surface of the water. The curious stages of transformation will richly repay daily examination with the microscope. The first development, after the egg has been maturing in the proper temperature for about thirty days, exhibits itself in two minute dots, which are the eyes of the young fish. The transparency of the structure enables the fish to be examined at a later stage, coiled up within the envelope or shell, when nearly ready to be hatched. Soon after this it may be caught in the act of emerging from the shell, and will then present to view a singular structure in which all the embryo organs can be examined by the microscope. For some time after being hatched, they have a transparent, jelly-like appearance, and the whole organization exhibits it self, in an extremely delicate and beautiful condition. The heart, blood vessels, liver and other organs, the gelatinous beginnings of gills, fins and bones, can all be distinctly traced, and although the structureis too frail to bear a touch, the motions are exceedingly swift. The most curious thing about them is a sac, resembling the air sacs or floats found inside of adult fishes, which is carried suspended beneath the body but three times its size at first, and is filled with an oily looking fluid, analogous to the yolk of an egg. This supplies the entire nourishment of the young fishfor the first six or seven weeks of its existence. In fact, it is simply pursuing in freedom the process of growth and sustenance which land embryos need to undergo in confinement and shelter. As its fish grows, by absorption of the contents of the sac (or haversack) the latter diminishes, and eventually disappears, when the young creature begins to eat for itself, and takes on in miniature the functions and habits of a fully developed fish. It should not be let out of the breeding tank until this change takes place.

COMPRESSED BLASTING COTTON is manufactured and sold in charges by an English firm. After being reduced to pulp, it is compressed by hydraulic power so that a cartridge or charge of a given length and diameter, is equal in explosive force to six times its bulk of gunpowder, with the additional advantage of concentrating the charge at the very bottom of the hole.

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Science Familiarly Illustrated.

The Spheroidal State of Liquids.

When drops of water fall on a heated stove they assume the form of flattened spheres, roll about over the hot metal until dissipated by slow evaporation. This simple phenomenon was first brought to notice by Leidenfrost about a century ago, but it is to the later researches of M. Boutigny that we are mainly indebted for what knowledge of the subject we now possess. This philosopher christened this peculiar condition of liquids the "spheroidal state," and observed the following facts in relation to it: the temperature of the plate must be above the boiling point of the liquid; the temperature of the spheroid liquid—Boutigny found by immersing a delicate thermometer therein—is always lower and the temperature of the vapor is invariably higher than the boiling point of the liquid. If the experiment is tried with a heated plate of metal the liquid will continue in the spheroidal condition until the plate is cooled to a certain point, when the liquid will burst with an explosion into violent ebullition, and rapidly evaporate.

One of the most striking experiments which a knowledge of these facts led Boutigny to attempt was freezing water in a red hot crucible. He heated a platinum dish to redness, then placed in it a small quantity of sulphurous acid and a few drops of water. The former assumed immediately the spheroidal condition, and by its extremely low temperature readily solidified the water. Similarly Faraday, by using a mixutre of solid carbonic acid, succeeded in freezing mercury under like conditions.

Any liquid when in the spheroidal state is not in actual contact with the heated surface, but rests upou an interposed film of air, as on an elastic cushion. With a knowledge of this fact, the explanation is manifest, of the trick of placing the naked hand with impunity in molten metal. In this case the natural moisture of the hand assumes the spheroidal condition and acts as a shield or covering in preventing the liquid from coming in contact with the flesh. If the finger is drawn rapidly through the molten mass, the spheroids will be mechanically broken and unpleasant consequences must ensue. By first wetting the hand with ether it may likewise be safely plunged into boiling water.

An old Spanish proverb facetiously advises taking a basket to the well, or carrying water in a sieve. But these apparent absurdities have been actually accomplished, the success being due to the repulsive action of the liquid spheroids toward the heated surface. The original experiment Boutigny performed by heating to a red heat a basket formed of a net work of platinum wires. As long as this temperature of the metal was sustained water placed therein was prevented from passing through the meshes, but on gradually cooling the liquid was dissipated in vapor.

Boiler explosions may sometimes be explained by a knowledge of the facts relating to the spheroidal state of liquids, as when the supply is for any reason deficient, or as often happens on our steamboats stopping to load or unload freight or passengers, part of the flues are exposed to an undiminished fire by the careening of the boat. If cold water is now injected on to the red hot boiler it will first assume the spheroidal state, but almost immediately after will burst into a volume of vapor with a force sufficient to rend the boiler.

GLEANINGS FROM THE POLYTECHNIC ASSOCIATION.

The regular meeting of this branch of the American Institute, was held on Thursday evening, April 18th, Prof. Tillman presiding.

The hygrodeik illustrated in these columns some weeks ago, was exhibited before the association by its inventor; also a water meter which seemed very complete and efficient in its workings. Previous to the introduction of the regular subject for the evening, Prof. Vander Weyde spoke a few words in defence of American inventors, referring to the unwillingness of Europeans to yield to this class the right of priority in bringing out new ideas. The immediate occasion of his remarks was the receipt a short time since, of a letter from a friend in Europe, commending to his notice the use of laughing gas as a new anæsthesia in surgical operations of short duration; he replied that the application of nitrous oxide for this purpose was an American idea, and was extensively in use in this country.

At a recent meeting of the French Academy of Science the employment of this anæsthetic was disparaged because of alleged danger attending its use. In this country but one or two fatal accidents have ever been reported though the gas is so generally used in dental operations, and in these instances death was finally traced to other causes.

MR. PAGE ON PETROLEUM.

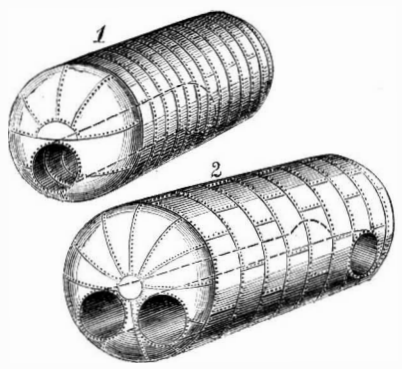
The purpose of these remarks was to show the connection existing between the lightest hydro-carbon oils and anthracite coal, proceeding in this order rather than in the ordinary way of tracing the origin of oil back to coal. The truth of his position Mr. Page sought to establish by exhibiting specimens of oil from all parts of the world, and of every grade of density. From the lightest oils he showed the different grades down to the heavy pitch of California; the gum beds of Canada, having the consistency of molasses; and finally bitumen, a substance so nearly identical with coal that some years ago in an important law suit chemists could not decide whether the coal of New Brunswick was in reality a coal, or an asphalt; a compromise being finally made and the name Albertite is now commonly given to it.

Mr. Page stated his belief that oil trickling down between the rocks, at first mixing with sand formed the coal shale, afterward the pure oil oozed in through the passage thus cleared, and by evaporation passed through successive changes, pitch, gum, bitumen, until finally it became a vein of true coal. The presence of fossils in coal, the speaker accounted for by referring to a statement made by Prof. Silliman, that if any living creature ventured into the pitch lakes of California, extrication would be an utter impossibility. Mr. Page spoke at some length and his remarks throughout were listened to by a large and attentive audience.

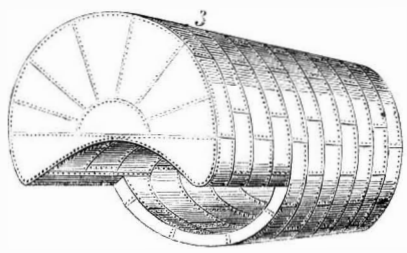
STEAM BOILERS---THEIR FORM, CONSTRUCTION, AND MATERIAL.

NUMBER THREE.

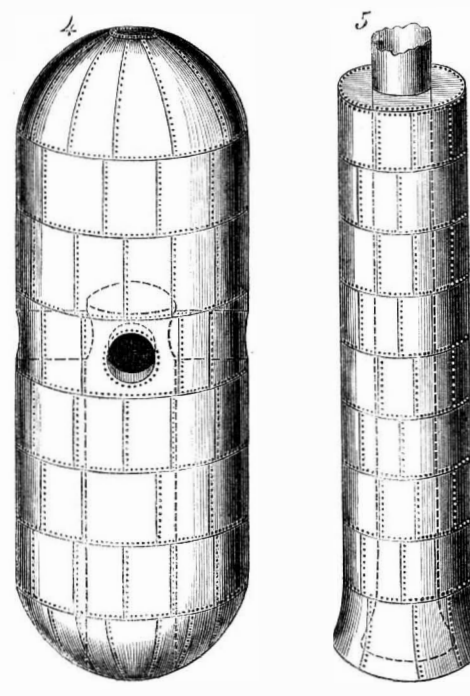
The device of internal tubes for increasing the heating surface of boilers was in use in the wagon boilers shown in the first article of this series, but it became much more common



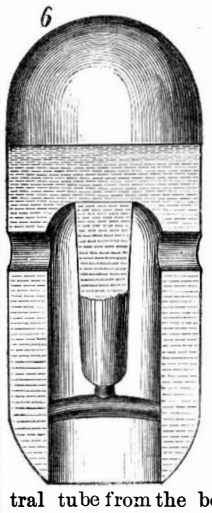
when the cylindrical boiler usurped their place. One of these is seen in No. 1 with a tube passing from the rear of the fire to the front of the boiler. No. 2 has two tubes which open at the front and at the sides near the rear end. Both these are externally fired. They are extensively used now



and are made as large as nine, ten, and even eleven feet in diameter, but these large sizes are an element of weakness. It may be questioned whether after the flame has passed nearly or quite the whole length of the boiler there can be much utility in returning the gases through



the tubes or flues, the principal advantage being in reducing the quantity of water in the boiler which is acted upon by the fire.



The wagon and cylindrical boiler were united in the Butterley boiler seen in No. 3. This is a cylindrical boiler having a wagon shaped projection over the fire, continuing as a gradually contracted flue through the boiler. It generates steam rapidly, but the part projecting over the fire has the inherent weakness of form which is the fault of the wagon boiler. So many of these boilers exploded that the fact prevented their very extensive manufacture.

Boilers of various forms for the utilization of the waste heat from puddling furnaces have been contrived, one of which, calculated for four furnaces, is shown at No. 4. This represents a boiler ten feet in diameter and twenty-eight feet high. It is an upright cylinder with hemispherical ends, having a central tube from the bottom to about half the hight, where it meets four transverse flues which open at the side. The heat from the furnaces impinges on a portion of the shell and entering the side flues passes down the center tube and off through an underground flue to the chimney. These are very strong boilers, presenting a large heating surface, and by the division of the heat all portions of the circumference of the shell are subjected to the same tension. The form of the ends insures very grest resistance to internal pressure, and the distance above the water line prevents priming.

Boilers for single furnaces called from their form, chimney boilers, have been extensively used. One is seen at No. 5, and is simply an upright cylinder with a tube running through it, the bottom and end of which is bell mouthed and the top end connected with the chimney flue. To protect the tube sheets from overheating where it passes through the steam chamber, it is lined with fire brick. No. 6 is a boiler having an internal fireplace of conical form with a suspended cone and cross pipe for increasing the heating surface. The shell is set in brick work in such a way that the heat passes through the side tubes and around the shell before passing off.

One form of the chimney boiler was called the elbow boiler and was merely a horizontal cylinder, having a downward projecting portion at right angles with the body, and in this the fire was placed, the heat of which passed through a tube conforming in direction to the angle of the boiler. The Cornish boiler is a horizontal cylinder with an internal flue of large diameter running from end to end. The fire was built in one end of this tube the products passing through the whole length of the boiler. This boiler is a great favorite from its great generating powers, economy, and durability, although there have been many instances of collapsed flues occasioned simply by weakness of construction. The Lancashire boiler contains two tubes or flues instead of one, but in other respects is similar to the Cornish boiler. An oval form, flattened from top to bottom, has been attempted for the purpose of reducingt he depth of the body of water above the flues.

In our next article we shall give some examples of explosions of the different classes of boilers already mentioned.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

The Rights of Society and of Labor.

MESSRS. EDITORS:—A remark occurs in your paper for April 27th, which will appear to many of your readers to require explanation in view of your natural position as a champion of workingmen. You say, speaking of the strike on the locomotives in England, "Society must and will exist, right or wrong, whatever else has to be crushed under its necessities." I should reply to this as the celebrated Frenchman is said to have done to the highwayman, who justified himself by saying that he must live:—"I do not in the least see the necessity." If the organization of society necessarily involves the "crushing" of anybody, the sooner a total reorganization takes place the better. The very same argument was used to justify and uphold slavery, yet that form of "society" was able to bear the upheaval, and the world "still lives."

It cannot be denied that the only redress the workingman has against the natural and unceasing inroads of capital is in concert of action; and his "necessities" are at least equal to those of "society." If the work of civilization *must* be done, let it be paid for. If it is so necessary, let the price be commensurate—at least let the workingman be considered a constituent of society, and not its slave. Thank heaven, the society alluded to is that of England, not yet of America.

Examples might be adduced, as that of the pilots on the Mississippi for instance, who ask and are able to command such compensation as seems to them a fair equivalent, and yet "society" does not go under. I will not enlarge, however, as I wish to be very brief, in order that you may be induced to print this comment and answer it fairly, as it is a practical question, and one of the deepest interest and importance, particularly if extensively misunderstood. HENRY HOBART.

Washington, D. C.

[Our remark will hardly "appear to require explanation" to those who keep awake while they read. But as some people *will* read without reflection or even attention, they must be reminded that the words quoted only say that society "*will* exist, right or wrong," but not that it ought to. We may add that, like our correspondent, we do not see the necessity for anything or anybody to exist in contravention of justice. But neither his opinion or ours will change human nature, or withstand the imperious necessities, real or supposed, of human society, and hence it is not best for parties to push their rights, real or supposed, to the point of forcible collision with those necessities, for they will certainly have to take the smash—that is all. Our correspondent is very careless again, in substituting for "society" which we said, "the present organization of society" which is quite another thing, and can be destroyed if justice or expediency require, as society itself can not.

Happily there is no possible antagonism, in the long run, between the interests of society and of any of its members. Justice to all is the only stable foundation of society Consequently, its inevitable maintenance, to which we referred, does not involve destruction to the interests of the producing classes, if they are maintained with a due regard to the rights of the whole. No community can or ought to flourish which does not recognize their just claims, with those of all others: but this question of the rights of labor and capital is one that has puzzled the wisest brains, and like all other great problems it will require time to work out the proper solution. It seems to be rapidly progressing toward the union of both parties in mutual interest, which we conceive to be the only equitable principle on which it can be adjusted. No country has a greater stake than our own in promoting the best interests of the working classes, and it is little to our credit that both Englishmen and Frenchmen are

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ahead of Americans in developing the coöperative union of labor and capital.—Eds.

Can Heat be Accelerated or Retarded.?

Messrs. Editors:—In No. 13 of the present volume is an article entitled "The Sun's Spots—A Discovery," which I read with interest at the time. But I was not satisfied with the expression "the heat withdrawn by Jupiter and Venus from the side exposed toward them," etc., and have been patiently waiting to see if some inquisitive person other than myself would not call out the explanation I now desire to get.

I therefore propose and ask as follows:—Do we not understand that light and heat are forces continuously radiating from the sun as a sphere? A continuously transmitted force reacts upon itself and ultimately upon its source, against every fresh obstacle it encounters. In the way of a moving force nothing can be interposed that will accelerate the discharge of that force, though it might retard it, or in other words cause a greater amount of reactionary effect. If the foregoing premises are correct, I would ask how can a planet at any point in its orbit withdraw from the sun a greater amount of heat than was being radiated to that particular point before the planet became interposed there?

It is inconceivable to me how radiated heat can be thus accelerated in its discharge. And if it be asserted that the cold influence of a planet extends across half the diameter of its orbit through the medium there interposed, and thus by conduction cools the exposed side of the sun, several interesting queries at once spring up. Must not the planet be a perfect iceberg or even have the temperature of frozen mercury to do all this? If Jupiter be one of these cold fellows laying on his icy fingers at the immense distance of half the diameter of his orbit, why has it not been observed of him that when in conjunction with our earth he makes us see "spots" much nearer home?

Let us hope the astronomers will yet give us some satisfactory explanation of the phenomena in question, and not freeze out the general interest with such chilling suggestions.

C. A. G.

Chicago, Ill., April 18, 1867.

[The theory quoted in our paragraph is certainly contradictory to what we understand to be the nature of heat and the effect of a reflector interposed in its path. It is doubtful philosophy, however, to assume that such interposed object retards or crowds backward the series of heat impulses, as a fluid current is dammed and set back upon itself by an obstruction. It is difficult to detect any interference between opposite or cross impulses of light and heat: we may assert that practically at least there is none. Hence the rebound of one such impulse could not be said to react upon another following it; or if considered as one indivisible and constant impulse, it could not be said to react upon itself. The impulses are thrown back, or reflected, as we know, on striking a substance more or less reflective, and actually return and intensify heat upon the substance which radiated it. All grades of reflective power are exhibited by different substances and substances in different conditions, down to the gases, which have very little, and perhaps are in some cases gaseous from that very fact. Going still beyond them, and supposing a substance with a minimum of such power, or practically none, we have a medium which offers practically no resistance, obstruction or reflection to the light and heat impulses, and is consequently penetrated and rarefied to an inconceivable tenuity by the very faintest thrills of force; which answers to our present conception of the luciferous ether. This supposition makes the observed non-interference of rays not only possible but necessary, and at the same time justifies their (practically) infinite susceptibility of reflection and condensation. They must either make their way into an object, or rebound, and that with a practically unobstructed and unobstructive movement from it, and hence there can be no such thing as a retardation of rays by an obstruction in front of them.

In regard to the conjecture of a calorical influence upon the cause of the sun's spots, from the opposition of the planet Venus, it would seem that it must operate in the opposite way to that suggested: *i. e.*, by reflection rather than withdrawal of heat. But any effect of the kind from bodies so remote and relatively small, would seem again to be but infinitesimal in amount and theoretical in character. Science is confessedly but groping as yet on this subject.—Eds.

Hardening and Tempering.

Messrs. Editors:—In No. 15 I notice a communication from "B. F. S." in regard to the treatment of steel in hardening, and I think he is correct in his views as regards hammering and tempering, but I think that the steel in the bar before it is hammered at all by the smith has a great deal to do with the quality of the tool. All smiths are aware that we have different kinds of steel, designated as the "high or low steel" according to the amount of carbon contained in it, and it is well known that the more carbon steel contains the harder it is. Therefore in making tools from "high steel" the temper would have to be drawn lower to make as good a tool as would be made from "lower steel" with a higher temper. Correspondents "B. F. S." and myself are both thought to be in error by "E. M. F." in issue April 20th, and he thinks also that the color can not be depended upon to give the proper temper, nor can one tell by the color of a piece of steel whether it is hard or not, for he says a piece of steel polished and not hardened at all will assume the same colors that a piece will that has been. Now I cannot see as that proves anything, for we know that it requires the same degree of heat in an unhardened as in a hardened piece of steel to bring it to a corresponding color. There is a certain degree of heat which when given to steel and extracted very suddenly will chill the steel sufficiently so that the temper will not need drawing at all; but it is a matter of such nicety that it is preferred by smiths to harden, and then draw to the required degree of hardness, and that degree is determined by the color. At least, I do not find any trouble in determining the temper by the color after I have become acquainted with the steel in the bar.

There is another method though not any more correct than the former; that is to take a small hammer and strike the edge of the tool so as to raise a small piece higher than the surface and then strike it the other way, and if when it is nearly knocked off it does not fall off, it is considered to be of the right temper although it may vary slightly as there is more or less heat in the tool; this method cannot be used except on the larger tools. As to the degree of heat in working and tempering I never heat higher than is required to harden the steel, and then hammer until nearly cold.

Why a tool that is hardened with a higher degree of heat requires drawing to a lower temper, is, I think, that in heating, the steel is opened and made more porous, and consequently of less strength, and then it must be drawn to a lower temper to be equally as strong as finer steel with a higher temper; but a tool tempered with a higher degree of heat when hardened, will never be so good a tool to cut as one in which the particles of steel are more close and compact.

W. S. D.

American Wrought vs. Chilled Wheels.

Messrs. Editors:—I have noticed several articles upon chilled and wrought wheels and should like to give my views upon them. If the wrought wheel is made in the proper manner, it is far superior to the chilled wheel, 1st: The wrought is only half the weight of the chilled. 2d: It is flexible in the center, and therefore in turning sharp curves will not shear the rails or wear out the journal boxes as severely as if rigid. 3d: It is safer from breaking. 4th: It will live as long as the chilled wheel. 5th: It can be made larger in diameter and go over more ground with the same revolutions, besides overcoming the friction on the journals. 6th: It can be run at a higher speed, as vibration has a great deal to do in breaking chilled wheels. 7th: The rails will last much longer, for this reason: the wrought wheel will wear a smooth surface, while I notice that some of the chilled wheels wear lumpy on the face of the head; thus making ragged rails.

I am well aware of the English wheels wearing flat places on them. It is also easy to account for the Prussian steel wheels breaking, because they are never manipulated. The difference between the English wrought wheel and the American, is that the English have a tire heated and shrunk on, which leaves them soft, while the American wrought wheel is made in one piece from Bessemer steel or wrought iron, put into the machine hot and forged until cold; thus making what is called a cold-forged wheel. The tread is both hammered and rolled at the same time. As to the price of the wheels, the wrought will be the cheapest in the end: for instance the wrought wheel weighing 260 lbs. and the chilled wheel weighing 252 lbs. Again, when one is worn it has to be recast, while the other can be reforged several times over at a trifling expense, say one dollar each. I think any practical man will see at a glance that a cold forged wheel will be the safest in the world and the best.

S. Vanstone.

Providence, R. I.

[We publish with pleasure the above notice of a new wrought wheel of American invention and manufacture, and sincerely hope it may take an important place, which there certainly is for such a wheel, even without crowding out the chilled wheel. But we think our correspondent would have made his case stronger without putting weak points into it. For instance: the chilled wheel undoubtedly wears better in the tread, while the wrought wheel is less liable to fracture; and of these advantages the former proves by experience by far the greater, as to the mere life of the wheel. It is in point of safety only, that the wrought wheel naturally excels: in longevity, the chilled wheel has the advantage. Again, there is no advantage in enlarging car wheels beyond the ordinary size of the cast wheel, which would not be lost in racking and lateral friction. Further, the chilled and not the wrought wheel has the advantage in uniformity of wear; while it might have been truly said that in destructiveness it is as much the worse as it is the harder, on ordinary soft rails. Steel rails, on the contrary, will banish the soft-tread wheel, which is entirely unfit for them. Finally, a machine that will heat and reforge a wheel, and roll the tread, at an expense of only one dollar, is a wonder that railroad men would be glad to see, but don't care much to hear of.

On the whole, we believe Mr. Vanstone is on the right track. The defects of both the chilled and wrought iron wheel are too manifest to be endured if they can possibly be cured; and their respective virtues united would make a perfect wheel, the proper counterpart and companion, with its hard tread and tenacious body, to the steel-faced and iron-based rail that we have already.

Milk Sickness.

Messrs. Editors:—In No. 16 I notice an article on the cause of milk sickness. Though but little acquainted with the Western lands, I have carefully studied the causes which produce it in East Tennessee, and western North Carolina. My observation showed me that no one plant was the true exciting cause, that it occurred in the richest land, generally on spots shaded until late in the day and where the vegetation was rank; also, that it ceased to exist when the land was cleared and cultivated; and that cattle kept up until the dew was dried by the warm sun never were infected with the milk-sick poison, while those who were out all night or were turned out early did have the poison diffused through their system.

In general it is but a slow poison with the animal, yet most rapidly fatal to the eater of the flesh or drinker of the milk. There are many poisons which act similarly. My observation taught me, that there were a number of plants which were poisonous when wet with dew, but perfectly harmless when dry.

Animals generally refuse to touch plants which are known poisons. There are many plants poisonous in themselves which grow in sections where milk sickness is never known. The morning dew, especially of the mountains, has at a certain time of summer a sweetish taste which is peculiarly liked by cattle.

H. E. Colton.

Brooklyn, N. Y., April 23, 1867.

The Man with the Squeaking Boots.

Messrs. Editors:—I once read in the Scientific American that an application of hot tar to the soles of new boots would make them not only water proof, but much more durable. Acting upon this suggestion, some months since I applied a good coat of tar to a pair of new boots, and the result is the water is entirely shut out and the *squeak* most effectually shut in. Though I have worn my boots for nearly six months in all kinds of weather, yet, whether wet or dry, there is no end to their everlasting squeaking, and this evil is aggravated tenfold by our plank sidewalks. The villagers all know when I am coming, and whither I go, by the hideous noise of my boots. Even the darkness of the night does not screen me from their knowledge of my whereabouts, and my reputation, I fear, is likely to suffer by their evil suspicions and surmises. Can you suggest a remedy?

Jones.

[We feel sorry for Jones. Perhaps he will find consolation in the fact that others are miserable from similar causes. We commend to him the celebrated case of the man with the cork leg.—Eds.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

Cultivator.—J. E. Tate, Columbia, Tenn.—This invention has for its object to furnish an improved cultivator designed especially for use in cultivating cotton; but equally applicable to other uses.

Brick Machine.—John W. Burns, Henry, Ill.—This invention relates to a machine for molding and pressing bricks, and it consists in a novel manner of operating the plungers by of which the ground or tempered clay is forced into the molds, and also in a novel arrangement of the plungers with the mud mill, whereby the clay may be molded and prossed into bricks very expeditiously and in a perfect manner.

Gate.—Elias Roth and George Shane, New Oxford, Pa.—This invention has for its object to furnish an improved gate of that class that are so constructed and arranged that they may be opened and closed by a person in a vehicle or on horseback; which shall be simple in construction, cheap, light, and not liable to get out of order.

Fork for Elevating Hay and Grain.—L. M. Doudna, Elmira, N. Y.—This invention relates to a hay and grain elevating fork, designed more especially for loading wagons or carts in the field from cocks or shocks. The object of the invention is to obtain a fork for the purpose specified, which will be capable of grasping and elevating at once an entire cock or shock of ordinary dimensions and admit of having the cock or shock when elevated, readily released from it.

Steamer Bottom.—W. S. Potwin, Chicago, Ill.—This invention consists in stamping the bottoms of culinary steamers from one piece of metal and at one operation with ribs or beads, projecting upward from the surface, and with a channel projecting downward forming a deep groove around its outer edge.

Illusory Decapitation.—J. C. Withington, Brookline, Mass.—This invention relates to a device by which the head of a human being would seem to have been taken off before the eyes of a public audience.

Revolving Horse Hay Rake.—Thomas N. Henderson, Jackson, Mich.—This invention has for its object to furnish an improved revolving horse hay rake, the parts of which are so constructed and arranged that they may be adjusted to hold the rake head at any desired angle while raking; and that the rake head may be at all times completely under the control of the operator.

Coffin.—Henry Smith, Jr., Summit, N. Y.—This invention consists in combining a frame prepared for the reception of a glass plate with the lid or cover of the coffin in such a way that the upper side of said frame shall be flush with the upper surface of the said lid or cover; and which shall be covered and secured in place by a small lid or cover.

FarmGate.—J. H. Nonamaker, Middletown, Pa.—This invention consists in attaching a large wheel to the side of the forward end of the gate, and a stop and guide hook to the fence post at the rear end, and in the combination and arrangement of two grooved pulleys with the rear end of the gate and with the rails of the adjacent fence panel.

Hay Fork.—S. Harris and Daniel A. Harris, Shippensburgh, Pa.—This invention consists in the construction of the levers and bars by which the finger or harpoon is operated; the whole construction being so simple and substantial that the fork is not liable to get out of order. The same principle may be employed on a double fork, that is a fork with two harpoons or fingers, which points toward each other when brought to a horizontal position.

Lantern.—P. J. Clark and Joseph Kintz, Meriden, Conn.—This invention consists in constructing the lantern in such a manner that the upper or globe portion may be readily turned over to expose the top of the lamp so that the same be lighted and have its wick trimmed and also be filled without removing the lamp from the lantern; the invention also admitting of the globe when broken or injured being readily removed or detached and a new one adjusted in its place.

Potato Digger.—E. S. Lenox and Edward Spaulding, New York City. This invention relates to a potato digger, the scoop of which is provided with flaring wings so that a broad wide track is made, which facilitates th separation of the potatoes from the dirt. The sides or wings extend beyond the front edge of the scoop, and the cutting edge of the latter is V-shaped, or concave, with a projecting extension in the center, so that the scoop begins to cut at its sides, whereby the bursting of the hill is avoided. To the rear edge of said scoop is hinged a grate or riddle, formed of sheet metal bars, to which a vibrating motion is imparted by suitable gearing, in such a manner that the dirt and potatoes raised by the action of the scoop are readily separated by the action of the grate, and the potatoes can then be easily collected.

Shifting Rail for Attaching Tops to Carriage Seats.—Frederick Baumgartner, Brooklyn, N. Y.—This invention has for its object to furnish a neat, simple, convenient and substantial mode of attaching the shifting rail to the stationary rail of the carriage seat so that when the top has been removed no bolts or projections will be exposed to catch upon and tear the clothes of those riding in the carriage.

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COMBINED WASHING, WRINGING AND CHURNING MACHINE.—Andrew J Mapes, Independence, Mo.—This invention has for its object to furnish an improved machine by means of which clothes may be quickly and thoroughly washed and wrung, and by means of which churning may be easily, conveniently and quickly accomplished.

GLAZIER'S DIAMOND.—Philip Sinsz, Baltimore, Md.—This invention consists in pivoting the breaker to the handle and swiveling the diamond block to the breaker so that the breaker and block may be closed upon one end of the handle at the same time thus enabling the instrument to be conveniently carried in the pocket.

TICKET FASTENER.—Samuel B. Fay, Franklin, Pa.—This invention consists in the use of a loop made of wire for the purpose of holding tags or tickets to fine fabrics to supply the place of pins which have heretofore been used for that purpose which injures the fabrics to a greater or less extent by being perforated.

CULTIVATOR.—Oliver Etnier, Mount Union, Pa.—This invention relates to an improvement in cultivators and harrows and consists in attaching an adjustable guide blade or rudder to the rear end of the center beam for steering or controlling the movement of the cultivator so that it shall run straight on hillsides.

LANTERN.—William Porter, Sen., and Wm. Porter, Jr., New York City.—This invention consists in arranging an upright flange around and on top of the base of the lantern. A hook-shaped extension of one of the guard wires is passed through a hole in the flange; the opposite guard wire has an eye or ring-shaped prolongation which also passes through a hole in the upright flange. A hook or catch arranged on the underside of the covering plate of the base engages the ring or eye and thus holds the guard securely to the base and consequently also the globe and cap of the lantern; by simply detaching the catch from the eye the upper portion may be removed from the base of the lantern.

ORE WASHER.—John Wicks, Greenland, Mich. The nature of this invention consists in the combination of an ore separator with a slime pit and the form of the separator and its connection with its slime pit. It also consists in the combinaton of a walking beam and connecting rod with a hutch, and also in the combination of huddles with slime pits.

DRAW BAR FOR LOCOMOTIVES AND CARS.—Daniel C. Cannell, La Fayette, Ind.—This invention has for its object the constructing and arranging of a link and draw bar in such a manner that a sufficient degree of vertical adjustment will be allowed the link to admit of its being adapted to car platforms of different lengths thereby preventing the breaking of bumpers, a contingency of frequent occurrence with the ordinary draw bars.

COMBINED RANGE AND AIR-HEATING FURNACE.—William H. Armstrong, New Brunswick, N. J.—This invention consists in arranging an upright range in a fireplace in such a manner that the former may perform its legitimate functions of cooking, baking, etc., and at the same time made to perform the function of an air heater or furnace and also as a water heater. The object of the invention is to combine a range and air-heating furnace at a cost not materially exceeding that of the range alone, and economize in fuel by utilizing all the heat radiated from the range.

QUARTZ CRUSHER.—Robert Bailey, Idaho City, Idaho.—This invention consists in constructing a rotary battery for crushing gold and other ores for the extraction of the metals they may contain by amalgamation with quicksilver, the object of which is to combine the principle of action of the ordinary stamp battery for breaking or crushing the rock by a blow, with that of the Mexican arastra which reduces it to a fine powder by friction or rubbing.

SHOEING HORSES.—Pierre Charlier, Paris, France.—This invention relates to a new and improved method of applying the shoes to the hoofs of horses and other animals, the hoof being provided with a recess extending around its edge of such a depth and width as to allow the shoe to drop in flush with the sole of said hoof in such a manner that the animal is enabled to walk on its own sole with much more steadiness and safety than it can on the shoes as generally applied, and at the same time the shoes applied according to this new method form a perfect protection to the hoof.

OILING DEVICE FOR JOURNAL BOXES.—G. M. Morris, Cohoes, N. Y.—This invention has for its object to furnish an improved device for oiling journals which shall be simple in construction, effective in operation and easily removed and replaced when worn.

VENTILATING SMOKE STACK.—Joseph A. Miller, New York City.—This invention consists in providing the top of a smoke stack with conical channels, which form sharp corners at their inner lower edges, and expand outward in such a manner that by said channels the wind is caught from whatever quarter it may blow, and caused to create a powerful current up through the smoke stack, whereby the draught of the same is materially increased. If the smoke stack stands on low ground, or is exposed to downward currents or wind, it will be provided with a cap in addition to the conical sharp-cornered contracting channels.

STREET PAVEMENT.—Geo. W. Grader and Matthias H. Baldwin, Memphis, Tenn.—This invention consists in the use of a cast-iron framework, which is arranged so as to form a number of square or polygonal cells, in which wooden blocks are arranged; these blocks project above the iron framework, so that the latter does not come into direct contact with the hoofs and wheels, and is consequently not so easily worn. The wood when worn can be easily removed and replaced by new blocks.

BALANCE VALVE.—George H. Myers, Philadelphia, Pa.—This invention relates to a slide valve, which is provided on its back with a cavity to receive suitable springs and packing pieces, together with a top plate, which is faced off so that it works steam-tight against the inner surface of the valve chest cover, and the valve is relieved from the pressure of the steam on its back. Through the top plate of the valve, and the packing pieces extends a pin which has its bearing in a socket in the body of the valve, and which is secured to a slide, which takes the place of the valve rod and moves in suitable guides on the top of the valve chest, in such a manner that no stuffing box is required, and the valve can be operated with the least possible friction.

ROTARY ENGINE.—Spencer H. Brown, M. D., New York City.—This invention relates to a rotary engine, the piston wheel of which is composed of a thin disk, which works steam-tight between two annular rims projecting from the inner surfaces of the cylinder heads, and which is provided with one or more pistons, the ends of which are faced off to work steam-tight against the inner surfaces of the cylinder heads, while their top and bottom edges are so shaped that they work steam-tight against the inner circumference of the cylinder and against the peripheries of the annular rims, the whole being so constructed that the weight of the piston wheel is reduced as much as possible without reducing the effective area of the pistons, and furthermore, by using ground joints all packing is rendered superfluous and the friction is reduced to the lowest possible point.

RAILWAY SWITCH.—James McLaughlin, Duncannon, Pa.—This invention relates to an improvement in railway switches, and has for its object the dispensing with the frogs now used in switches, and which are the fruitful source of accidents. The invention consists in the application of a supplemental rail, whereby the switch is rendered perfectly safe and reliable. The invention also consists in an improved means for operating the switch, whereby the same is prevented from casually moving.

METALLIC BOBBIN.—Charles T. Smith, Utica, N. Y.—This invention relates to a useful improvement in the construction of metallic bobbins, patented by this inventor October 16, 1866. The present invention consists in the means employed for securing the wooden heads or flanges on the metallic tubes.

LINING FOR CARPETS.—William Fuzzard, Chelsea, Mass.—Carpets when laid upon a naked floor soon become worn and materially disfigured on account of a lack of elasticity, and to obviate this difficulty linings of various kinds have been employed. The original lining consisted simply of straw spread evenly over the floor, and old newspapers have been used for the purpose, but more recently factitious linings have been devised, the one in most general use, and now extensively manufactured, consisting of "shoddy" batting interposed between paper sheets. This lining greatly protects the carpet, preventing abrasion and wear, but it is objectionable on account of furnishing a harbor for moths, and not permitting the dust to pass through it. This invention is designed to obviate these difficulties, and at the same time retain the advantage of elasticity pertaining to the present lining in use.

PONTOON BOAT.—John Hegeman, Vischer's Ferry, N. Y.—This invention has for its object to furnish an improved pontoon boat, which can be built very light, and which will, at the same time, be very strong, and which can be folded into the smallest and most compact compass for transportation, without injury to the strength of the boat.

GAME REGISTER.—John Enright, Louisville, Ky.—This invention has for its object to furnish an improved instrument, by means of which the number of points made and the number of games played may be accurately and conveniently registered.

SHAPING SHEET METAL.—Morris Wells, Williamsburg, N. Y.—This invention relates to a machine for shaping sheet metal, in which the die, together with the bed supporting the same, are raised against the clamp and plunger, the clamp being secured to a cross plate, which bears against an adjustable spring, whereby it is rendered yielding, and the plunger being secured to a cross head, to which a rising and falling motion is imparted by a crank in the same shaft, which also carries the cams or eccentrics which serve to impart the required motion to the die and bed supporting the same. The clamp being secured to a yielding plate, is capable of accommodating itself to blanks of unequal thickness.

COMBINATION TOOL.—John Lyle, Newark, N. J.—This invention consists in a tool provided with a V-shaped jaw, which forms the bearings for the fulcrum pins of two movable jaws, which in combination with the ends of the V-shaped jaw form two tools of a different nature, such as pliers on one, and a punch on the other side, or a punch on one, and an eyelet fastener on the opposite side, and a tool is thus obtained which is cheap and of great convenience. A suitable stop which passes through holes in the V-shaped jaw and in the movable jaw, serves to throw either of said movable jaws out of work.

STEAM PUMP.—James Edward Thorp, Erie, Pa.—This invention consists in operating directly on the water by pistons or plungers with the ordinary valves.

CORN PLANTER.—John Clarridge, Pancoastburgh, Ohio.—This invention has for its object to furnish an improved corn planter, by means of which the corn may be dropped promptly and accurately, and covered properly; and which may adjust itself to the unevenness of the ground over which it passes.

SPRING SHADE ROLLER.—Stewart Hartshorn, New York City.—This invention relates to an improvement in spring shade rollers, those which have a spiral spring connected or applied to them in such a manner as to roll up the shade and thereby dispense with the cord and pulley originally used for that purpose.

MILL FOR ROLLING CLEVISES AND SHARES FOR PLOWS.—Felix Murray, Pittsburgh, Pa.—This invention relates to a rolling mill for rolling clevises and shares for plows, whereby said articles may be manufactured very expeditiously and at a moderate cost.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters, must, in all cases, sign their names. We have a right to know those who seek information from us: besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

J. H. S., of Pa., asks:—"What is the best and most practicable method of hardening cast iron, steel, and wrought iron?" As our correspondent appears to be a practical man we do not think we can assist him, but the best method of hardening steel we know, is heating and plunging, in water, and of cast iron to cast it in chills, or, like wrought iron, to heat and saturate with prussiate of potash and cool in water, or by the ordinary process of case hardening by packing in an iron box with ground bones and leather scraps.

B. H., of Ky., in reply to J. E. of Pa., in our issue of April 13th, says a piece of grindstone makes a good float for a steam boiler but that a cast iron float is better than either stone or copper.

J. M., of Ill.—The varnish usually employed for maps, lithographs, etc., is a solution of gum mastic in alcohol

P. J. S., of Ohio asks how he can secure the eccentric of his engine without keying. The set screws do not hold it. Probably the valve works too hard, but replace your ordinary set screws by cast steel ones, the ends of which drill slightly and turn the outside beveling until you make a concentric edge around the hole; than harden the end or point and draw to a dark straw. The bevel should not be over 45°. This annular edge will cut a ring on the shaft and seat itself firmly.

H. C. V., of Texas, desires to know how to color his meerschaum. He has smoked it eight months and only partially succeeded. We know of no better way than to "fight it out on that line." The pipe is probably not a meerschaum.

J. C. L., of Pa.—If you wish to construct an underground cistern it may be done in a hard dry soil by plastering with hydraulic cement—one-third cement and two-thirds clean sand—directly upon the earth. In this case the bottom must be much smaller than the top, so that the sloping sides will retain the plaster in place until dry. If built of bricks the cistern may take any other form. In a valuable treatise called "The House," published by G. E. and F. W. Woodward, 37 Park Row, New York city, you will find full particulars on this subject.

A. F., of Pa.—Sulphurous acid is much used for fumigation, due regard being had of the precautions, mentioned on page 187 Vol. XV. You need have no fear in using it in an empty house. All sensible traces of the gas are promptly removed by ventillation. There is no difficulty in burning sulphur. Sulphur takes fire at a low temperature and burns very persistently; it burns in an atmosphere when ordinary fire would be smothered.

J. H. W., of Wis.—A patent covers and includes all the exact equivalents of the invention. But the question whether a legal equivalence exists is often doubtful, and is only to be decided in the courts.

C. R. of Mich.—A few drops of bi-sulphide of carbon mixed in the plating solution will cause silver to be deposited bright. The process is however not much used, for a better surface is given by the ordinary burnishing.

W. B., of Ala.—The sample you send is mica, often called isinglass. It is a valuable mineral and we recommend you to secure it.

W. K., of Tenn.—The solution of chloride of gold in ether is sometimes used for gilding on steel. If you add to it just before using a small quantity of oil of cloves or cassia the gold will be deposited on glass.

D. C. H., of N. Y.—The virtue of copying ink consists in its non-drying property. This property may be given to any ordinary ink by the addition of sugar. Lately, however, glycerin has been substituted for sugar, and is decidedly to be preferred. The quantity of glycerin needed may be easily determined by trial.

J. N., of Pa.—To make soldering fluid get 1 pound of muriatic acid and put into it ½ lb. of zinc in small lumps. As soon as the bubbling ceases, the acid has dissolved all the zinc it can, and the fluid is ready for use. Some think it advantageous to add an ounce of sal-ammoniac to each pound of the fluid.

J. W. B., of Ill.—No useful solvent of vulcanized rubber is known, and there is no good cement by which broken or torn vulcanized rubber goods can be mended. These two things are much desired, and any one who finds them will be handsomely rewarded.

F. B., of Mass.—The acids used for pickling and coloring brass and other alloy castings, are sulphuric, nitric and hydro-chloric. These are used in mixture of various proportions.

W. A. Moore, of Pa.—The most durable varnish contains linseed oil, and is the only sort which will bear much handling or rubbing. One of the best spirit varnishes is four parts shellac and one part sandarach dissolved in alcohol.

V. L. C., of Miss.—"We are running an engine from a cistern and wish to know the cheapest method of condensing steam." The meaning of this question is not clear.

F. P. M., of Tenn.—The brilliancy of shellac varnish is increased by adding sandarach. The final polish of spirit varnish is often given by rubbing it with a rag which has on it a little raw linseed oil.

O. C. M., of Pa.—Plaster of Paris is used to make the molds for soft rubber which is to be vulcanized.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

W. G. Burgin, Carthage, Mo., wishes to purchase machinery for manufacturing straw paper. Manufacturers and patentees will please send circulars and address as above.

I. F. Beach, of Bastrop, Bastrop county, Texas, wishes to correspond with makers or dealers in machinery for the manufacture of tubs, buckets, and churns from red cedar.

Manufacturers and dealers in aluminum please send their address to Wm. Hoeden, Box 1,444, Philadelphia, Pa.

Manufacturers of pottery or stone ware please send their address to Dr. W. W. Smith, Montrose, Susquehanna county, Pa.

Wanted to purchase the best lathe for turning taper pen-handles. Address W. A. Morse & Co., Philadelphia, Pa.

NEW PUBLICATIONS.

WEIGHTS AND MEASURES ACCORDING TO THE DECIMAL SYSTEM; with Tables of Conversion for Commercial and Scientific Uses. By B. F. Craig, M.D. New York: D. Van Nostrand, 192 Broadway, New York.

An excellent little treatise on the decimal system of weights and measures now legalized in this country by act of Congress, containing tables, simple in arrangement and easily understood, for reducing common measures to the new system. The reading matter is so plain and logical as to enable any one of ordinary capacity to understand the principles of the decimal system and familiarize himself with its details. The volume is of a convenient pocket size and will prove a valuable manual to the masses as well as to the scientific man.

WOODWARD'S RECORD OF HORTICULTURE FOR 1866, edited by Andrew S. Fuller. New York: Geo. E. and F. W. Woodward, 37 Park Row.

This is the first of a yearly series of books giving the actual state of horticulture, the additions to the list of fruits and flowers, the improved methods of cultivation, etc. It contains a list of treatises on the subject, which will be found not the least valuable portion of the volume, as it is not a mere catalogue, but a series of descriptions. Methods of propagation, cultivation, and management of our small fruits, ornamental plants, and flowers, with useful hints in gardening, laying out walks, etc., illustrated by engravings, make this a welcome treatise to all who desire to make home surroundings useful and beautiful.

EXTENSION NOTICES.

Thomas D. Burrall, Geneva, N. Y., having petitioned for a patent granted to him the 6th day of Dec. 1845, extended for seven years the 6th day of Dec. 1859, reissued the 10th day of Oct. 1865, for an improvement in Corn Shellers, for seven years from the expiration of said patent, which takes place on the 6th day of December, 1867. This second extension having been authorized by act of Congress, it is ordered that the said petition be heard at the Patent Office on Monday the 2d day of September next.

Richard Montgomery, of New York City, having petitioned for the extension of a patent granted to him the 12th day of July, 1853, for an improvement in sheet metal beams, for seven years from the expiration of said patent, which takes place on the 12th day of July, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 24th day of June next.

Simon M. Elder, administrator of the estate of John A. Elder, deceased, of Portland, Me., having petitioned for the extension of a patent granted to the said John A. Elder the 26th day of July, 1853, for an improvement in curving the backs of books for seven years from the expiration of said patent, which takes place on the 26th day of July, 1867, it is ordered that the said petition be heard at the Patent Office on Monday the 8th day of July next.

George T. Parry, of Philadelphia, Pa., having petitioned for the extension of a patent granted to him the 2d day of August, 1853, for an improvement in anti-friction boxes, for seven years from the expiration of said patent, which takes place on the 2d day of August, 1867, it is ordered that the said petition be heard at the Patent Office on Monday the 15th day of July next.

Samuel Darling, of Bangor, Me., having petitioned for the extension of a patent granted to him the 30th day of August, 1853, for an improvement in apparatus for grinding and shaping metals, for seven years from the expiration of said patent, which takes place on the 30th day of August, it is ordered that the said petition be heard at the Patent Office on Monday the 12th day of August next.

William Butterfield, of Boston, Mass., having petitioned for the extension of a patent granted to him the 4th day of July, 1854, for an improvement in sewing machines, for seven years from the expiration of said patent, which takes place on the 24th day of November, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 2nd day of September next.

Nathaniel Gear, of Marietta, Ohio, having petitioned for the extension of a patent granted to him the 8th day of November, 1853, for an improvement in machine for turning or cutting irregular forms, for seven years from the expiration of said patent, which takes place on the 8th day of November, 1867, it is ordered that the said petition be heard at the Patent Office on Monday the 30th day of September next.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

3,163.—PTEROTYPE OR MACHINE FOR WRITING WITH TYPE.—John Pratt, Greenville, Ala. December, 1866.

533.—COVERING OR CUSHION FOR HORSES' FEET.—Samuel Adlam, Jr., Charlestown, Mass. Feb. 27, 1867.

549.—RAILWAYS AND MEANS OF PROPULSION USED THEREON.—Joseph A. A. Fontaine, New York City. Feb. 27, 1867.

643.—SAFETY VALVES FOR STEAM BOILERS OR GENERATORS.—George W. Richardson, Troy, N. Y. March 7, 1867.

675.—BRIDLES AND REINS CONNECTED THEREWITH.—Samuel B. Hartman, Millersville, Pa. March 9, 1867.

838.—MACHINERY FOR MANUFACTURING FLOUR.—John Brown and Alexander Hart, Utica, N. Y., and Allen B. Ralph, James H. Cutler, and Dexter N. Knight, Providence, R. I. March 22, 1867.

740.—BOXES FOR CONTAINING, PRESERVING, AND TRANSPORTING BUTTER AND CHEESE.—Wm. B. Guernsey, Norwich, N. Y. March 14, 1867.

742.—CRAMPING AND LIFTING APPARATUS.—Henry H. Baragwanath, New York City. March 14, 1867.

751.—BALE TIE OR FASTENING.—Osborne Macdaniel, New York City. March 15, 1867.

755.—ROTARY ENGINE AND PUMP.—Dexter D. Hardy, Covington, Ky. March 15, 1867.

760.—BELT HOOK OR FASTENER FOR PIERCING DRIVING AND OTHER BELTS OR BANDS.—Frederick G. Wilson, Lowell, Mass. March 16, 1867.

761.—BREECH-LOADING FIRE-ARM.—Benj. S. Roberts, Maj. Gen. U. S. Army. March 16, 1867.

760.—BREECH-LOADING FIRE-ARM.—Silas Crispin, New York City. March 16, 1867.

792.—SEWING MACHINE.—James S. McCurdy, Brooklyn, N. Y. March 19 1867.

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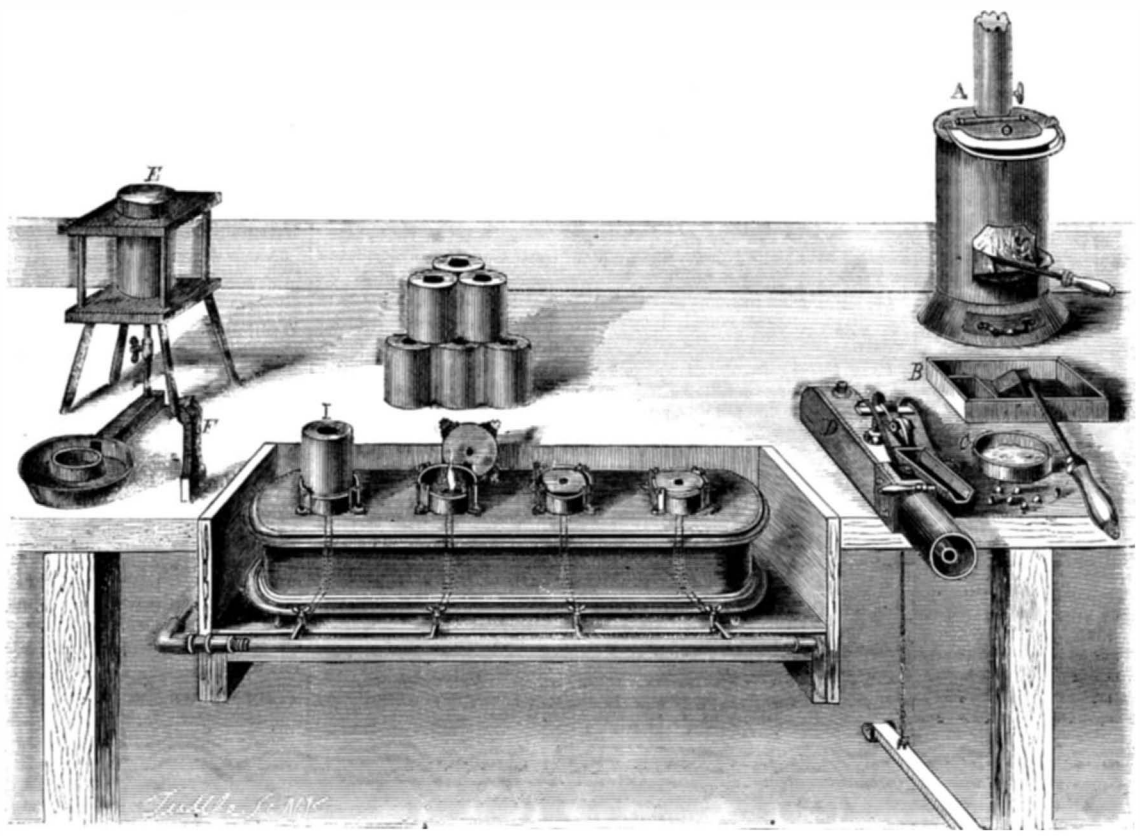
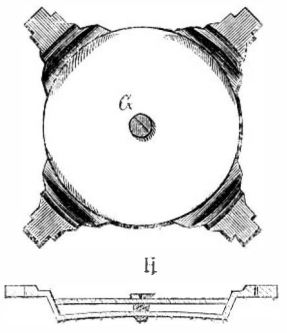
Hollingsworth's Can-Soldering Apparatus.

The preservation of meats, vegetables, etc., by hermetically sealing them in tin cans has become an important business, and apart from its pecuniary benefits to those engaged in the preparations of these things for the market, the advantages on the score of health are neither few nor trifling. Any process, therefore, which will reduce the cost, by simplifying the manufacture, is of general utility. This is the object of the apparatus herewith represented. The circumferential body of the can is rolled and the longitudinal seam closed in the usual manner, and the top and bottom made. Contrivances for soldering the seam of the body are seen on the right of the large engraving. They consist of an improved bench furnace, A, bench tray, B, with hatchet irons, a resin box, C, and a seaming apparatus, D. This last is the main peculiarity in this department. It is bolted to the bench having a projecting stake for the reception of a can body. A treadle brings the double knife appendage down on the tin, when the solder and iron is applied and the seam is quickly secured. The edges of this double knife hold the seam perfectly closed until the solder has been applied. This knife can be raised or lowered by nuts on the standard to which it is attached by an arm, so that it may fit any sized can, from a pint to a gallon. One of these nuts is above and the other below the bench. The edges of this knife hold all the resin and solder on the seam, and they are so placed as to form the proper angle for the soldering iron. When not in use two springs raise it from the stake, lifting the treadle, ready for the reception of another can.



HOLLINGSWORTH'S CAN-SOLDERING APPARATUS.



The operation of securing the top and bottom to the can, called "floating", is performed without the aid of a soldering iron. A circular groove is formed around the inside edge of the top and bottom, into which the end rims of the can body fit. This groove is so formed that the outer portion of it projects a little way up around the body of the can, making a sort of lap joint and leaving a slight recess around the inside edge. The soldering is wholly from the inside of the can. At E, on the left of the large engraving, is an apparatus for delivering the liquid rosin. It is merely a gallon glass bottle inverted in a suitable frame, and having a straight pipe secured in the neck, which pipe reaches within one-third of an inch of the bottom of the conductor to the resining pan. When the faucet on the pipe is turned the resin flows into the pan to the depth of one-third of an inch and remains at that hight, ready for dipping the edges of the cans. F is a small anvil for drawing in the edges of cans of thick tin to make them fit the bottom and top.

In the center of the engraving is a furnace carrying a number of cups for "floating" the can tops and bottoms. The construction of these cups can be seen in the small engraving. G is a top view of one, showing four angles, which are furnished with grooves to receive the annular projections on the tops and bottoms. H is a vertical cross section of the cup, showing the double bottom which is filled with asbestos or some other non-conducting substance to prevent the heat from being diverted from the circumference of the can to the center. These cups rest by their arms on four standards recessed to receive them, the feet of the standards having interposed between them and the main plate of the furnace a piece of felt or other non-conductor to confine the heat to the point desired.

In the center of each four of these standards is a gas pipe the flame of which impinges on the bottom of the cup and rapidly heats those portions at the arms which are solid. Surrounding the flame is a sheet iron guard to prevent its flickering by the wind. The bottom or top of a can being fitted to the body, a strip of solder wire is placed in the annular recess and the can set on the cup, as at I. When the solder begins to flow the can should be shifted and shaken a little to distribute the solder evenly, and the work is done.

There seems to be a great advantage in forming a groove around the top and bottom plates, thus making a lap joint which will not in soldering effect the longitudinal joint. Also in soldering from the inside, thus obtaining a plumber's joint. If still greater security is desired the bottom or top can then be soldered on the outside. Unskilled labor can be employed in making cans by this process and with this apparatus. The work is rapidly performed, as must be evident by an examination of the engraving. Where gas cannot be obtained coal oil may be substituted. The inventor says his concern has a capacity of making from 6,000 to 10,000 cans per day. That the cans are perfectly air-tight is evident from samples of vegetables and fruit we have tested, which are two years old, each as perfect as when first put up.

Patents were obtained through the Scientific American Patent Agency September 12, 1865, and April 16, 1867, by Robert J. Hollingsworth, of Cincinnati, Ohio. For machines, and territorial rights address Percival, Semple, & Co., 16 Main street, Cincinnati, Ohio.

Tunneled Street Crossings.

Several correspondents have suggested tunnels under the streets for crossings as being less objectionable than bridges, particularly to ladies. One correspondent would have three or four at crowded crossings, lighted with gas if necessary, and about eight feet below the surface. To protect the entrance steps from accumulations of snow, light roofs of glass might be erected over them, the entrances to be closed at nightfall. We hardly agree with him that ladies would prefer them to bridges, unless the passages were guarded by policemen.

Eickemeyer's Improved Governor for Marine and Stationary Engines.

The governors of the valves of steam engines generally in use, either those which govern by the conical pendulum or by the motion of fans, are incapable of rapid self adjustment. They are liable to incessant oscillations and vibrations, arising mainly from their tardiness of action. They are incapable of acting at the instant when the equilibrium between the force exerted and the resistance to be overcome is disturbed, and act only after the fly wheel or other machinery of the engine has received such an impulse that the governor balls or the fans revolve with sufficient velocity to overcome the resistance of the throttle valve.

In the governor represented in the engravings the conical pendulum is entirely discarded, and the balance of the chronometer is substituted, involving the idea of combining the invariable motion of an independent balance with the varying speed of the engine, so as to make the former arrest instantly the fluctuations of the latter.

Fig. 1 is a perspective view of the governor and valve and Fig. 2 is a vertical section through the center, showing the connection between governor and valve. The power of the engine is applied to the flanged pulley, A, and the motion transmitted through the friction clutch, B, to the horizontal shaft on which the worm screw, C, is fastened, which rotates a worm gear on an upright shaft and through that communicates motion to a verge or pallet engaging with it. Attached to the upright spindle on which the verge swings is a segment of a gear that meshes with a pinion, bearing on the same shaft a coiled spring, E, and a balance wheel, or its equivalent in two horizontal swinging balls. The lever, F, is swung on an arm of the frame and is held against the horizontal lever by a spring, G. The other end of the lever engages with the valve stem and its throw is governed and regulated by check nuts on the stem. The tension of the spring is determined by the nut, H. The are valves two disks, and a set screw and jam nut, I, are used to adjust the valve opening, so that in all cases there will be a supply of steam to start the engine. The tension of the coiled spring, E, is controlled by screws in an arm to which one end of the spring is attached.

Fig. 1.

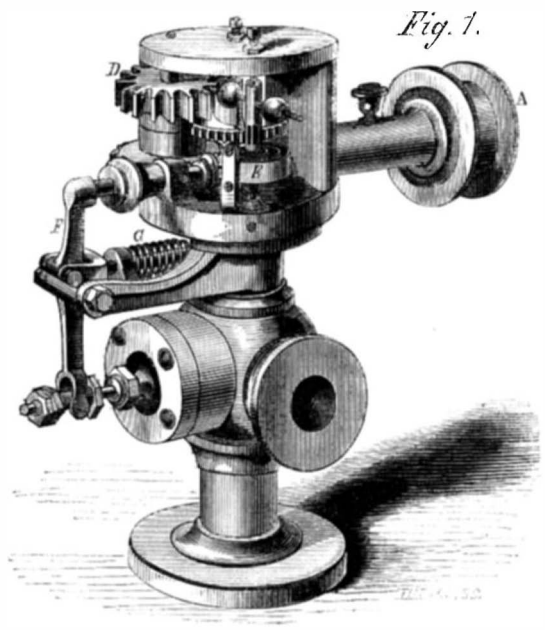
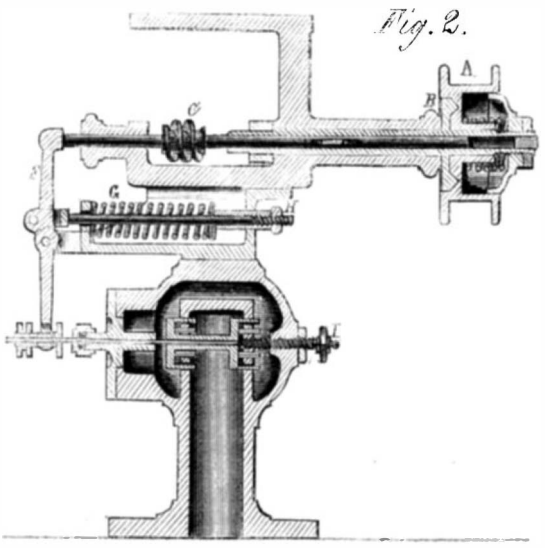


Fig. 2.



The operation is this: motion being given to the pulley, A, the worm, C, moves the wheel, D, and consequently operates the escapement formed by the pallet, the segment spring and the revolving balls with a uniform motion. So long as this movement is only rapid enough to neutralize the action of the escapement and balance, the spring, G, will keep the worm screw in one position, and consequently by the lever, F, keep the valve open. But when, by the increased velocity of the engine, the speed of the worm screw exceeds the legitimate speed of the gear, the gear acts as a fixed nut and sliding the longitudinal shaft, S, closes the valve by the action of the lever, F. The closing of the valve will thus be exactly proportioned to the excess of the velocity of the screw or worm over that neutralized by the escapement balance. If, on the contrary, the speed of the worm shaft is less than is necessary to counteract the motion of the balance, the spring, G, will operate the lever, F, and open the valve. Whenever the two motions correspond the valve remains stationary. It will be seen that the valve is not controlled by a centrifugal acting governor, but by the irregular velocity of the engine. The friction clutch, B, is introduced to prevent undue strain on the escapement and to insure the instantaneous opening of the valve whenever the engine has come to its normal speed.

To alter the speed of the engine it is only necessary to change the position of the balance balls on their arms secured to the shaft that carries the coiled spring. The inventor claims that this governor has the following advantages: It is a positive regulator of the speed of the engine, keeping it under all circumstances at the same number of revolutions per minute; it can be altered to increase or decrease the number of revolutions from 25 to 50 per cent without altering the driving gear; in all positions in which it may be placed it will act equally well, thus adapting it for marine as well as stationary engines; it reduces the fluctuations of velocity so that they are hardly perceptible, and is compact, elegant, and unfailing in operation.

It was patented in August 1865 and has been in operation several years, never failing to give entire satisfaction. For further information apply to Osterheld & Eickemeyer, Yonkers, N. Y.

Another Crystalization of Glycerin has been noted by a manufacturer at Vienna, but under different circumstances: the article having simply stood in an iron tank for a year or more, suggesting the possibility that the solidification may have been connected with the presence of iron in solution.

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VOL. XVI., No. 19....[NEW SERIES.] ....*Twenty-first Year.*

NEW YORK, SATURDAY, MAY 11, 1867.

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CAUTION.

It has become necessary for us to state very distinctly that the Scientific American Patent Agency Offices are at No 37 PARK ROW, and not at No 39.

THE SEWING-MACHINE MANUFACTURE---WHAT IT HAS ACCOMPLISHED.

To attempt any adequate notice of the benefits the invention of the sewing machine has showered upon mankind at large would require volumes. The struggles of Howe, who for years battled against poverty, prejudice, and interested opposition, and of Singer, Wilson, and others, whose inventions were coldly received for a long time, have had their rich reward, not only in pecuniary success, but also in a recognition of their merits by the whole civilized world. But this is not the object of the present article; it is mainly to refer to the benefits conferred upon mechanics and on the public by the improvement in tools and in methods of doing work, and also in awakening a more general interest in machinery.

The castings for sewing machines must be very light, very smooth, and very perfect. Some of the delicate parts will compare favorably with the fine Berlin work so much admired for ornamental purposes. These requisites have necessitated great improvement in the skill of the molder and in the accuracy of the pattern maker. In regard to the molding, many parts which formerly were molded from halved patterns are now "coped," reducing the cost and increasing the durability of patterns, which are the most costly appliances used in casting. When these castings come from the pickling tank they are of wonderful smoothness and finish, and in working seldom show blow holes. In this respect the sewing machine manufacture has been of immense benefit to this department of the arts. The demand for perfect and finished castings was imperative, and the demand was met.

In the introduction of new processes of finishing and ornamenting, the invention of the sewing machine was a great boon. Electro-plating in gold and silver was previously an art seldom employed for purposes of utility; japanning was confined mainly to a coarse process used on tin ware; inlaying was generally done on articles of a purely ornamental character, by mechanically recessing the material to be ornamented and setting the foreign substance by hand in the recess. All this is changed. The chemist's laboratory has been, in part, transferred to the manufactory. Dealing with chemical compounds and practicing chemical processes have become familiar, to a certain extent, to our mechanics. This is an advantage to them and a benefit to the public. The beautiful finish on the castings of the sewing machine, a finish which resists oxidation, abrasion, and time, and is so superior to the paint and varnish formerly employed, is that of the japanning process demanded by the requirements of that ornament to the parlor and sitting-room, the sewing machine.

The artistic ornamentation of its parts by inlaying with mother-of-pearl and other iridescent materials has added another branch to the wide range of mechanical manipulation. By cementing these beautiful substances on the iron, and filling the interstices with a varnish which hardens like iron, all the effect and the durability of the old time inlaying is assured at a fraction of the cost.

Then in the perfect finish of those parts the surfaces of which are not covered with a layer of a more precious metal, or hidden by japan or ornamental shell, the sewing machine has been a great advantage to mechanics. The perfection of the forgings required, demanding the most cultivated skill; the invention of machinery to insure accuracy and multiply products; the absolute exactness demanded where hand labor is indispensable, all show the influence of the sewing machine on the practical education of mechanics, and consequently on the advancement of mechanical art.

There is one other aspect of this subject worthy of notice. That is the introduction of the fairer sex to the beauties of machinery, making them interested in the subject. Sometimes in visiting manufactories in company with ladies we have been surprised that they evinced no interest in the machinery but only in the results of its operation. So on board one of our moving palaces, the River or Sound steamers, they were more interested in the upholstery and hangings of the cabin than in the workings of the powerful monster that propelled the floating hotel through the water. The sewing machine has changed all that. We have now female machinists, not those only who run sewing machines, but women who can direct and put together a machine; who can use screwdrivers, wrenches, and other mechanical tools, and ascertain a fault in the adjustment of the mechanism and remedy it. And, to tell the truth, they are not behind their fellow workmen of the other sex in their love for and adaptability to the work.

Here is an avenue opened to woman. She may even invade the province of the "greasy mechanic" without becoming "greasy," and, with her instinctive delicacy of touch and judgment, succeed where he would fail.

ENCOURAGEMENT TO MANUFACTURES---THE NEWEST MODE.

Public encouragement to manufactures is always eagerly conceded by those who find themselves directly interested in the increase of substantial prosperity around them— substantial or productive prosperity, as distinguished from mere activity in exchanges. To take a recent striking illustration: The city of Augusta voted a release of two years' taxes to the proposed Sprague corporation, beside aiding it with a quarter of a million of her bonds, and the citizens of Oxford, in the same state, have since voted ten years exemption to all manufacturing capital hereafter introduced in lots not less than $10,000. In like manner those really interested in the growth and wealth of any place will always gladly pay a moderate indirect tax of any kind to encourage manufacturing industry at their own doors. There is no difference of opinion among practical men, of whatever political school, in a case thus brought home to themselves,

In all countries, tribute is gladly paid by other interests to the Arts that profit all: the kind of tribute varies in different cases, and that is all the difference. In England, it happened that the tribute took an opposite form to that rendered in this country: but free trade meant practically the same thing there that protection means here, namely, encouragement to the Arts. Agriculture, after a blind and bitter struggle indeed, gave up its protective tariff, that England might become, through cheap bread, the workshop of the world. Agriculture now knows that it has gained a hundred fold for what it gave up, and would no sooner resign manufactures for the sake of a close corn market, than a man would exchange his house for the lumber or the trees it was built from.

In America, on the other hand, we gladly agree—mere traders and theoretical economists excepted—to pay or risk paying a temporary tax on foreign manufactured goods, that the all-profiting Arts may become great among us. If that is not enough, through the effect of deranged currency and heavy taxation, then local interests band together and say to manufacturers, "we will pay your taxes, if you will come hither and build us up." This method of supplementing an insufficient national encouragement to manufactures, although placing the burden of a national benefit on the shoulders of a few, is yet so manifestly profitable even to the few, that we expect to see it extensively adopted, while the present difficulties of business enterprise continue. Thus much is certain: that in one way or another mankind must and will have the Arts, and no community will content itself in bucolic simplicity, after books and newspapers have opened its eyes to the prosperity of others and its causes. The question is between resting in a comparative barbarism, with few and primitive arts, accepting like savages all improvement at the hands of others; or on the other hand, placing ourselves among the foremost in all that advances humanity, and making the rest of the world debtors and dependents instead of ourselves. For we do not achieve progress by purchasing its fruits from others. Not consumption, but production, makes a people great: and gathering corn or gold from Nature is not production but only a form of consumption. There is no national greatness in mountains of gold or cotton or corn: it is only in the genius that can feed its workshops with these crudities and transform them into utilities; and to the hands of that genius they all must flow, no matter where they come from, just as all the rivers flow to the sea.

We remarked that the general impulses of self-interest are infallible; but we must qualify that with the proviso that the case must not be too complex for self-interest to comprehend itself. Within such limits the selfishness of all communities that want prosperity works in the same way, and is so far infallible—it craves and subsidizes willingly the aid of the Arts. Could selfishness be enlightened one step beyond its mere instinct, so far as to perceive that no class of arts or interests can flourish alone, but that all are allies, and their union multiplies the powers of each by the sum of all, then we might realize a consistent, harmonious public policy, fostering with a liberal hand every art that needs encouragement, in the assurance that every other interest must be ultimately enriched by paying tribute to a dominant principle of productive progress.

ALUM AND PLASTER OF PARIS, well mixed in water and used in the liquid state, forms a hard composition and is a useful cement.

IMPROVEMENT IN MECHANICS' TOOLS.

To the observant man whose attention has been directed to the immense advances toward the perfection of machinery made during the past twenty-five years, no step in this direction will strike him more forcibly than the improvements in tools. The machinist, for instance, who could have enjoyed a Rip Van Winkle sleep for a quarter of a century, and should now awake and essay to work at his trade in a well-appointed shop, would find himself as far behind the requirements of his business as when he first entered the shop as an apprentice. He would find the file, which in his day was the favorite tool, scarcely ever out of his hands, superseded by the planer, shaper, milling machine, turning tool, and many other devices which perform the work more accurately, quicker, and with much less expenditure of labor. The center punch, bench centers, and hammer have largely given place to the centering machine; the screw cutting and tapping machine does much of the work formerly performed with the hand screw plate and hand tap; the slotting machine cuts the key ways, and more perfect bench tools, as gages, try squares, straight edges, etc., assist in the manual labor.

Any other mechanical business will show a similar progress; indeed, there are few of the old tools except those which have been superseded by more modern appliances that have not been more or less modified and improved. Although all or nearly all these improved appliances are labor saving, yet the demand for skilled labor is fully as great as ever. Skill is required in the proper management of these tools as well as in their production. An inefficient and unpractised workman will as surely ruin a job in using the best and most approved tools as though he employed improper appliances, while by the aid of superior tools the good workman can turn out superior work.

MUTUAL ASSISTANCE AMONG MECHANICS.

In No. 17 current volume we published an engraving and description of a device which will prove valuable to many mechanics all over the country and possibly to some in other countries. It was a simple tool for drawing a wood screw the head of which had broken. Given by Mr. Lewis Garrigus, of Waterbury, Conn., a mechanic, to his fellow mechanics, it affords an illustration of the oneness of labor—the generous willingness of one mechanic to assist another. There is much more of this generosity exercised than is publicly known, but it seems as though there could be no adequate reason why more of it should not be known.

The time has gone by when every advance made by an individual mechanic should be made a secret, or if conjectured or its effects seen, be held as a mystery. There are many improvements made by practical workmen which cannot be the subjects of patents, and yet would be useful to the grand fraternity of workers, and through them beneficial to the world at large. Is it not the duty of the inventors in such a case to allow their improvements to be put to extended practical use by their publication? The benefits would be increased and the discoverer gratified by the publicity given to his improvement and the credit accorded to him, while if he selfishly concealed his knowledge, in many cases he would not be pecuniarily advantaged. "Art is long but life is fleeting." This the old Latins understood when they said: "*Ars longa, vita brevis,*" and the neglect of the legitimate inference is the reason we now are compelled to speak of the "lost arts." This love of the possession of a useless secret, or rather of a secret whose usefulness is contracted, is gradually giving way to a more catholic and human spirit, and it is a promising sign of future progress in the arts.

DOGS VERSUS WOOL.

The wool product of this country is seriously discouraged, and quite shut off on many farms, in consequence of the multiplication of worthless and predatory dogs. The last Agricultural Report contains the returns of the number of sheep killed by dogs in the year 1866, made by the correspondents of the statistical division of the Bureau. The amounts foot up 130,427, from reports supposed to cover at most only about one fourth of the ground; allowing as a safe estimate, 500,000 sheep worth $2,000,000, destroyed yearly by that invaluable pet, the dog. That this estimate is within the truth, may be seen from the number reported and paid for by law in Ohio, which amounted in five years to 203,824. The loss in New York has been estimated by the Secretary of the State Agricultural Society, at 50,000 in a year.

Unfortunately for the sheep, the dogs have votes, while the sheep have not. That is, the "representatives of the people" know that there are ten men who would be enraged by a dog tax and would govern their votes by no higher consideration, where there is one farmer who would allow a few dead sheep more or less to control his public duty. Of course it is only the more degenerate and mangy class of curs that enjoy the right of political citizenship, with the consequent civil right of killing their neighbors' sheep. Decent dogs pay their taxes cheerfully or change places if they cannot afford it, content themselves with such bones as they can honestly come by, and never aspire to dictate the votes of their masters and the policy of the government. But for "curs of low degree" this is a free country, where one dog's vote is as good as another's "and betther too."

METER AND TESTING APPARATUS FOR DISTILLED SPIRITS.

The losses of the Internal Revenue Department of the Treasury by fraudulent returns from distillers, and the consequent seizure of distilleries and of spirits created a demand which would not be evaded for some automatically

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registering apparatus for recording and exhibiting the amount and the quality of the products of the still. The abuse of the power possessed by inspectors and the dishonesty of some manufacturers have been carried to such an extent that large amounts of whisky have been offered for sale at a less price per gallon than the government tax of two dollars. For this state of things a remedy was imperatively demanded. We think the demand has been met.

The Secretary of the Treasury appointed Professors Henry and Hillyard, of the National Academy of Science to investigate devices intended to register the quantity and quality of the spirits distilled, and they reported in favor of an invention by Mr. Isaac P. Tice, of New York city. Consequently, Mr. Tice's apparatus, several patents in which were secured through this office, has been ordered to be attached to all stills in the country. Next month (May), every distiller must give notice of his desire for one of the meters and deposit the money for the same, as a condition of his continuing his business. An order will probably soon be issued that these meters shall be attached by November next, and Mr. Tice has made arrangements for supplying the demand, however great it may be.

The points contemplated by the introduction of this device are the following:

1. An automatical registration of all the liquid, whether high or low wine, which passes from the still.
2. A similar record of the strength of the spirits from time to time as they are produced.
3. An arrangement by which the distiller may be allowed, at will, to take the necessary proofs of the spirits as they come from the still, and separate the low from the high wines, without being able to interfere with the automatic registration.
4. The inclosure of the measuring apparatus in a safe, which shall prevent interference with its interior and cannot be broken into with bearing evidence of burglary on subsequent inspection.
5. The isolation of the doubler and condenser, so that no liquid may be abstracted from them by concealed tubes or other means.
6. An arrangement by which assurance is given that all the low wines which pass from the worm are returned to the doubler.
7. Such regulations as will insure successive and independent inspections by different persons at irregular times.

The *modus operandi* of the registration process is simple, and the proposed methods of inspection are as follows:

1. The distiller must report at intervals, as provided by law, the amount and strength of the product of each day.
2. The samples taken by the meters are of two kinds, which may be designated as the long and short samples. The short sample, which indicates the strength of the liquid from day to day, and is intended to check the report of the distiller, must be drawn and inspected each day by an officer detailed for that purpose.
3. The samples to be examined three times in a month, or at irregular periods, by another officer especially detailed for that duty, and the results to be compared at the office of the Assessor, with the average results of the previous inspections, each officer reporting at the time of his inspection of the samples the indications of the dials, which automatically record the quantity and strength of the liquor produced.
4. At the time of the introduction of this system into a distillery, a minute description and drawing must be made of the relative position and size of the several parts, especially the diameter and length of the different pipes, the number of pieces of which they are composed, the indications of cracks, patches, or sold erings, the materials of which the tanks are constructed, the position of knots, splices, evidences of previous repairs, and other peculiarities of importance in ascertaining in subsequent inspections whether changes have been made. This drawing and description are to be kept in the office of the Assessor, for reference, and a copy transmitted to the Commissioner of Internal Revenue.
5. If an inspector shall fail to report any changes in the arrangement or in the apparatus from its normal condition, he should be deemed guilty of contrivance with the distiller in defrauding the Government.

The simplicity and the efficiency of the apparatus seem to insure its unfailing accuracy. Having inspected the machine, or machines, (for there are two), we will endeavor to convey an idea of their operation. The first machine is simply a beam balance poised on knife pivots in the ordinary way, and having at the short end a tank of a peculiar form, which, when one compartment is filled, reverses, emptying its contents and presenting another compartment to receive the spirit from the worm pipe. The depression of the short end of the lever, when the tank is full, actuates an arm that gives motion to gearing moving an index hand that traverses over a dial plate and records the quantity passing through. This dial, or its machinery, connects with a succession of dials, decreasing the movement of the pointers by tenths in the manner of the gas meter, so that the registration of the products of months and years may be recorded.

The apparatus for registering the strength of the run is on precisely the same principle—weight of the liquid. At the short end of the balance lever is a receptacle for the spirit and at the other end the beam traverses between two inclines on steps of which rest weights, which are taken up by the beam in succession as the end of the beam rises. The movement of the beam actuates a slide having an eccentrically curved face, which moves an index pointer by the medium of a friction clutch. There are trains of gearing as in the other machine, which operate other index pointers to record higher numbers by tenths, hundreths, etc. Besides these records there is a provision for running off a minute portion of the still for examination.

The whole apparatus is confined in an iron safe, enameled so that no tampering with it can be undetected. By means of the dials, covered with thick plate glass, the distiller or the inspector can at all times know the quantity and quality of the run.

Without diagrams we cannot exhibit the construction of these simple machines, but from the above the reader will be enabled to gather some idea of the principle employed.

ESTIMATING GUNS IN HORSE-POWER.

Eight pounds of powder fired in the old thirty-two pounder is able to give a thirty-two pound ball a velocity of sixteen hundred feet per second. It will be seen that these figures have a very simple relation to each other (1 : 2 : 4 : 200) and for this reason, and because they have been confirmed by many experiments they are familiar to all artillerists. Powder, 8; ball, 32; velocity, 1600—are household words with scientific gunners, and the old 32-pounder is very properly taken as a standard with which to compare guns of other caliber and other construction.

Now what is the force represented by the mass or weight, 32, having a velocity of 1600? How great is it, and what can it do? One of the measures of force is comprised in the formula mv^2, which applied in the present case gives us $32\times1600^2=$ 81,920,000. But 81,920,000 of what? Certainly not pounds or feet or foot-pounds or any other quantity with which the common mind is familiar. The formula and the calculation are correct, but they do not furnish us clearly with the information we seek.

A common way of estimating the force of a ball is to fire it at a target of wood or iron, and note how many feet or inches it penetrates. This plan, however, although instructive and useful, is quite crude and inaccurate when the object is to make an exact measurement. The principle on which it is based, namely, the determining the amount of resistance it can overcome, or the amount of work it can do, is well enough, but the trouble is that we have no accurate measure or conception of this resistance. There is another sort of resistance, however, which we do understand, and that is gravity; and it is gravity which furnishes us the unit of measure the foot-pound, which is now in almost universal use. How can we express the force of a projectile in foot-pounds? The question resolves itself into determining the hight to which a projectile will rise when resisted only by gravity; the product of this hight in feet, with the pounds of weight, gives us the number of foot-pounds. For the calculation we need the velocity of the shot (v), the velocity acquired by a falling body in one second, (g=32). and we have the hight (h) by using the formula $h=\frac{v^2}{2g}$. Thus we find that our ball having a velocity of 1600 feet, if projected up vertically will rise to a hight of 40,000 feet. As the ball weighs 32 lbs., $40{,}000\times32=1{,}280{,}000$ foot-pounds, which last represents the force of the ball. A horse-power is 33,000 foot-pounds, and $1{,}280{,}000\div33{,}000=39$ horse-power. Thus we find that the 32-lb. ball, on leaving the gun at a velocity of 1600 feet per second, does the work of 39 horses during one minute.

We used 8 lbs. of powder, which gave us a force of 1,280,000 foot-pounds: $1{,}280{,}000\div8=160{,}000$ foot-pounds, a little more than five horse-power for a minute, as the force of one pound of powder. The 32-pounder weighs 7,500 lbs.; then $1{,}280{,}000\div 7{,}500=170{\cdot}7$ foot-pounds for each pound of metal of the gun.

This kind of reasoning may, of course, be applied to any other velocity, shot and gun, and a table which brings together the results, shows at a glance some very curious and important relations. Such a table is appended.

In conclusion we have the pleasure to acknowledge our indebtedness to a paper entitled, "On the comparative strength of cannon of modern construction," read at a recent meeting of the American Academy of Arts and Sciences. The author of the paper is Professor Daniel Treadwell, of Cambridge, Mass., a gentleman who, for a long time has been distinguished for his valuable contributions to the science and art of gunnery.

	Old 32 Pounder.	10-inch Columbiad.	15-inch Rodman.	300-pounder Armstrong.	600-pounder Armstrong.
1	7,500	15,059	49,099	26,880	49,280
2	32	128	315	300	600
3	8	18	50	60	100
4	1,600	1,044	1,118	1,500	1,400
5	40,000	17,030	19,530	35,156	30,625
6	1,280,000	2,179,840	6,151,950	10,546,800	18,375,000
7	1·00	1·69	4·73	8·24	14·35
8	39·0	66·0	186·4	319·6	556·8
9	170·7	144·7	125·3	392·4	372·8
10	160,000	121,102	123,039	175,780	183,750

1. Weight of gun, lbs.
2. Weight of shot, lbs.
3. Weight of Powder, lbs.
4. Initial velocity of shot, feet.
5. Hight to which the shot would ascend if fired upward *in vacuo*.
6. For ce in lbs. raised one foot.
7. Force compared with a 32-lb. shot under a velocity of 1,600 feet a second.
8. Force in number of horses working one minute.
9. Number of pounds of shot raised 1 ft. by each pound of metal in the gun.
10. Force of 1 lb. of powder in foot pounds.

It should be borne in mind that the increase of resistance occasioned by rifling is not taken into the account, although it makes an important item against the Armstrong guns.

BUSINESS AND MANUFACTURING ITEMS.

Cotton.—The new Tecumseh mill, Fall River, Mass., in which work was commenced a few weeks since, will contain 20,480 spindles and 480 looms, will employ 250 hands, and turn out about 18,000 yards of 64x64 printing cloth per day. Much of the machinery was made in England.——A cotton manufacturing company has been started in Claiborne Parish, Louisiana, near Homer, with a cash capital of $40,000.——It is understood that the Sprague corporation will commence operations at Augusta this season by erecting dwellings for the large number of workmen to be employed upon their extensive buildings. They are now running the existing cotton mill on their recent purchase, with about 150 hands.——All the cotton and woolen mills at Westerly and Stillmansville, R. I. are idle, the operatives having "struck" against a proposed reduction of 15 per cent on their wages; which probably does not annoy the proprietors just now.——The cotton mill at Wesson, Miss., is spinning about 1,000 pounds of cotton per day, and its looms are now ready to make homespun. The company will soon put up machinery for making woolen goods.——Augusta, Ga., cotton mills are sending sheetings to New York.——The cotton mills in Petersburg, Va., have used 1,116 bales of cotton since the first of the year.

Iron.—The International Screw Company, at Northampton, Mass., is nearly ready to begin operations.——The Boston Commercial Bulletin says that Wm. Jeffers, a fire engine builder of Pawtucket, R. I., has turned his attention to the building of steam fire engines, pronounced by competent judges fully equal to those made by the Amoskeag Co., so celebrated in this country and in Europe. Mr. Jeffers has turned his inventive faculties to the construction of a little pleasure steamboat, which will run in four inches of water.——Capitalists are talking of an iron mill in Steubenville, Penn., on grounds where the power that drives the mill can be applied to hoisting coal out of the earth to run it.——The new Arms Company at Newburyport, Mass., will soon commence operations.——The manufacture of the Low-water Reporter is soon to be commenced at Newburyport. The company owning the patent has a capital of $40,000.——The new Sewing Machine Factory of the Wheeler & Wilson Company at Bridgeport, is 370 feet long, and covers nearly three acres of ground. It will contain 998 windows, and is fire-proof.

Wines.—There are two million two hundred thousand owners of vineyards in France, one thousand varieties of wine made, five million four hundred and thirty-five thousand acres of land devoted to vineyards, and in 1864 the yield of wine was one hundred and thirty-two millions of gallons, worth one hundred millions of dollars. The land used for vineyards is to a great extent upon hills where other crops would be unprofitable.——Of American wines, California and Ohio yielded in 1866 more than a million of gallons; Kentucky, 180,000 gallons; Indiana, 88,000; New York, 61,000; North Carolina, 54,000; Illinois, 47,000; Connecticut, 46,000; Virginia, 40,000; Pennsylvania, 38,000. One western manufacturer paid last year an average of 12½ cents a pound for all the grapes offered.

Miscellaneous.—More home-made "protection," is advertised by the town of Fayetteville, Vt., which offers a bonus of $5,000 to any one who will invest as much more in a saw or grist mill in that place.——An order was lately received in San Francisco from Japan for $10,000 worth of leather, to be used for military accouterments.——It is said that Florida produces lemons weighing over a pound, and twelve inches in circumference, obtained by a cross between the common lemon and the sour orange.——A company is forming in New York, with a capital of $9,000,000, to introduce the cultivation of coffee on a large scale in South Florida. It is proposed to engage about 2,500 laborers.——Over seventy new manufacturing establishments are either just opened or will soon be opened in Michigan, Illinois and Wisconsin.——A manufactory of fertilizers is to be started at Falmouth, Mass., with a capital of $1,000,000(?).——A large paper manufactory is to be erected in Camden, Me. The town has voted to exempt it from taxation for five years.——The new paper companies at Holyoke, Mass. (the Valley and the Riverside) will soon begin operations.——A paper mill has been erected at Golden City, Colorado, which will be turning out paper by the first of June.——There are eleven breweries in Erie, Penn., with an average capacity of 200 barrels per day.——Piqua, O., is to have a flax mill, 80 feet long, 40 feet wide and three stories high.——During the past year ten porgy oil factories have been erected in Damariscotta, Me. at a cost of $5,000 each.——A large sugar refinery has just been started in Portland, and another is getting organized in Bath. The great Portland cordage factory is also making progress in subscriptions.——The works at Chatsworth, Ill., have turned out about 100,000 pounds of beet root sugar, during the past season. The machinery was made in Europe, and is very costly.——The manufacture of glass was commenced at La Salle, Ill., in 1865. The sand found in that vicinity is well adapted for glass-making, and two other glass-factories have recently been started there. The people of La Salle call it the "Pittsburg of the West."——The Coys-Hill Cheese Company have begun to build a factory in Warren, which was to commence operations the first of this month with the milk of 350 cows.——The cheese factory now going up at Essex, Vt., will be 100 by 32 feet, two stories high, and will cost about $4,000.——The Methuen (Mass.) Woolen Co., propose to erect a new mill during the coming summer.——The preponderance of manufactures in proportion to population in the chief Eastern cities of the Union apparently belongs to Philadelphia, in which city the yearly product is equal to $240 per head. Next comes Boston with $212, and New York third, with $197: although the cheaper suburbs of New York locate a vast portion of the manufacturing industry of the metropolis proper, and if counted, with their population, in the estimate, might give a different turn to the scale. Looking at the gross amounts, we find in New York a product of about 160 millions a year, in Philadelphia 136 millions, and in Boston 38 millions.——The first locomotive built in Pittsburg was turned out a few days ago. It is a magnificent piece of workmanship, and was built for the Panhandle Railroad. The works are now fully under way and will be able to average about one locomotive per week.

Marine Life-saving Inventions.

The Government Commissioners for investigating life-saving devices, are still in session in this city, holding daily meetings and actively pursuing their investigations. On the completion of their labors their official report will be given to the public; meanwhile, we shall endeavor to keep our readers posted as to the more important developments, for to make a detailed report of each day's proceedings would prove more interesting to the inventors themselves than to the general readers.

The following has been the programme for the past week: Monday was occupied by the examination of safety valves and water gages. Tuesday the Commissioners proceeded down the bay on a revenue cutter, and tested several boat-detaching apparatuses and fog signals. Wednesday was spent in listening to the reading of papers on scientific subjects. On Thursday another trip was taken down the bay, and a trial of life boats and rafts was made on the Jersey coast, off Long Branch. Friday, the sixteenth session of the Board was held, and several low-water detectors and force pumps were experimented with; afterward the Commissioners proceeded to the Novelty Works, and later in the day inspected the life-saving devices provided on the steamers *Great Republic* and *Celestial Empire*, the new boats of the Pacific Mail Steamship Company.

A New Route Across South America.

By a recent naval exploration the navigation of the tributaries of the Amazon which rise in Peru has been extended to within 70 leagues of the Pacific ocean, at the seaport of Huachio, 63 miles northwest of Callao. The completion of this short link by railroad will be effectively stimulated by the exploration, and the commerce of Peru and other Pacific countries with Europe and the United States, will soon flow through the Mediteranean of South America instead of the tedious and dangerous route by Cape Horn.

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ISSUED FROM THE U. S. PATENT OFFICE
FOR THE WEEK ENDING APRIL 23, 1867.
Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat.....$1
On filing each application for a Patent, except for a design.....$15
On issuing each original Patent.....$20
On appeal to Commissioner of Patents.....$20
On application for Reissue.....$30
On application for Extension of Patent.....$50
On granting the Extension.....$50
On filing a Disclaimer.....$10
On filing application for Design (three and a half years).....$10
On filing application for Design (seven years).....$15
On filing application for Design (fourteen years).....$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the SCIENTIFIC AMERICAN, New York.

63,980.—ATTACHING KNOBS TO DOOR LATCHES.—Wm. H. Andrews, New Haven, Conn.

First, I claim the combination of the plate, b, with the spindle, C, and knob, B, constructed and arranged in the manner and for the purpose substantially as set forth.

Second, The rose, E, constructed in the manner described, in combination with the plate, b, and the knob and spindle arranged so as to insert and cover the screw or pin, a, substantially as and for the purpose set forth.

63,981.—GOLD SEPARATOR.—Gideon Aughinbaugh, Portland, Oregon. Antedated April 29, 1867.

I claim the principle of constructing series of selves provided with bars or ripples and placing the selves in an inclined shaker for the purpose of separating gold from earth, and the principle of operating said shaker upon pivots and the direct application of eccentrics to the shaker.

63,982.—MACHINE FOR GRINDING THE SURFACE OF MARBLE OR STONE.—John A. Bachman, Lambertville, N. J.

I claim a metal plate with rim and openings, combined with a water vessel and handle, in the manner and for the purpose substantially as herein described and set forth.

63,983.—BROOM HEAD.—Hiram Barker, Aurora, Ind.

I claim the cylinder, B, and binding wires or cords, E, arranged substantially as described, in combination with the broom handle, A, and plug, C, with their adjuncts, the holes, b b and a, substantially as and for the purpose set forth.

63,984.—VALVE GEAR.—E. M. Bates, East Rochester, Ohio, assignor to himself, J. H. and G. W. Sanor, Hanoverton, Ohio.

First, I claim the screw, F, shaft, D, cross head, C, and stay, J, as arranged in combination with the frame, A, for the purpose and in the manner set forth.

Second, The frame, K, cross heads, L and C, when arranged and operated conjointly by the eccentric rod, O, valve rod, M, and adjusting screw, F, for the purpose and in the manner as substantially described.

63,985.—SPRING FOR BED BOTTOMS AND OTHER PURPOSES.—L. M. Bates, Newark, Ohio.

I claim the tensile spring, A, composed of elastic gum and furnished with two heads, as and for the purpose described.

63,986.—ICE PITCHER.—Geo. H. Bechtel, Philadelphia, Pa.

I claim in double, or ice pitchers, the making of the inner shell or jacket in one piece, and without a joint, so as to prevent its liability to leak, substantially as described.

I also claim in combination with double-jacketed or ice pitchers, the making of the inner area thereof greater above its central portion than below that point, when this is attained by curved or arched top, bottom, and sides, and without angular joints, as and for the purpose described.

63,987.—MODE OF PREPARING COFFEE FOR TRANSPORTATION.—Thos. H. Berry, Lynn, Mass.

I claim the above described composition of matter, substantially as and for the purpose set forth.

63,988.—WINDOW LATCH.—Albert Bingham, Newtonville, Mass.

I claim the combination of the lever, D, the slotted plate, C, the springs, S, and beveled catch, E, the whole forming an automatic window latch, applied and operating as above set forth.

63,989.—CHURN.—A. H. Brainerd, Rome, N. Y.

First, I claim the binged dasher or dashers, L M, connected to the gate, K, and to the side of the churn respectively, and operating as described.

Second, I claim the arrangement of the series of compartments, A B C, and the hinged dashers operating simultaneously by the three throw crank, substantially as described.

Third, I claim the hollow and slotted slide covering the orifice through which the churn dasher reciprocates.

63,990.—BRICK PRESS.—Rufus Brunson, Chicago, Ill.

I claim the construction and combination of the side plates, B, jointed plates, C, with the rack, V, and follower, G, as operated by the lever, T, ratchet, S, and rod, R, and forming a diamond-shaped press, as herein described and for the purposes set forth.

63,991.—TINNERS' FIRE POT.—James B. Cary, Millersburg, Iowa, assignor to Cary & Young.

I claim the soldering iron tubes, f f, as secured to case, a, with catch, o, as set forth in the specifications.

63,992.—BORING TOOL.—John C. Chapman, Cambridgeport, Mass.

I claim the combination of the tapering plug, A, arbor, B, and sliding cutter or cutters, a, with the nut, D, all arranged and operating substantially as herein set forth.

63,993.—BED BOTTOM.—Hezekiah M. Clark (assignor to himself and E. A. Kelsey), West Meriden, Conn.

I claim the combination of the frame, D, half elliptic slotted springs, B, attached to ends of transverse slats, A, as and for the purpose specified.

63,994.—BREWING ALE.—Carleton Clifford (assignor to himself, A. W. Lake, and J. P. Saunders), Adams, N. Y.

I claim, First, The close cask or tank, A, provided with the discharge tube, C, or its equivalent, and employed to contain ale or other liquor while undergoing fermentation, substantially as and for the purpose specified.

Second, The combination with the above of the elevated receiving trough or box, B, and return tube, D, arranged substantially as and for the purpose specified.

Third, The water chamber, c, in combination with the receiving trough, B, substantially as described.

Fourth, The combination of the cask, A, tubes, C D, trough, B, box, B', pipe or tube, E, and water cylinder, F, all arranged substantially as and for the purpose specified.

63,995.—LINIMENT.—Lucian B. Cram, Weathersfield, Vt.

I claim the combination of the four above named simple ingredients in the proportions of each, or substantially in the proportions of each, above stated, for the uses and purposes above mentioned, as a new and valuable preparation for the treatment and cure of diseases and injuries, as above set forth.

63,996.—CONNECTING LINKS AND HOOKS.—Robert Creuzbaur, New York City.

I claim, First, Providing links and hooks with strengthening shoulders, substantially as described.

Second, Providing for locking as well as strengthening connecting links, substantially as described.

63,997.—WOOD-BENDING MACHINE.—John A. Dann (assignor to himself and Wm. F. Dann), New Haven, Conn.

I claim, First, The arrangement of one or more cranks, D, in combination with their respective hooks, T, and links, f, operating in connection with a former, I, so as to force the wood down upon the former, substantially in the manner herein set forth.

Second, A mechanism substantially as described, which operating in combination with a former, forces the wood down upon and automatically secures it to the said former, substantially in the manner herein set forth.

Third, The adjustable cams or levers, S, operating substantially in the manner and for the purpose set forth.

63,998.—BED BOTTOM.—John Danner and Samuel Danner, Canton, Ohio.

We claim, in combination with the slats of a bed or lounge bottom and the bearers that support it, the casting, a b, made and operating substantially in the manner and for the purpose described.

63,999.—LAMP.—Joseph Davis, Jr., Templeton, Mass. Antedated Oct. 23, 1866.

I claim the application of an expansive tube or case and a mass of cotton or brous stuffing to a lamp reservoir, substantially in manner as described, such tube in course of its application and after the insertion of the cotton or filling being expanded as explained.

I also claim the lamp, as constructed, with the tube-receiving recess as explained.

I also claim the improved lamp as constructed with the expansible tube and the receiving recess therefor, and as having a mass of cotton or fibrous material arranged in its reservoir and about such tube, as set forth.

64,000.—APPARATUS FOR REGISTERING GAMES OF BILLIARDS.—G. W. Earl and James H. Hawley, Kalamazoo, Mich.

We claim, First, Combining the hand, A, the arbor, B, the cam, C and the draft ratchet, D, with each other and with the indicating face of the machine, in such a manner that while the points of a game from one to one hundred can be indicated by said hand, and a reversed movement be imparted thereto at any portion of its revolution short of an entire game, yet the moment that that it passes said point a stop is interposed to prevent any backward movement of said hand, substantially as herein set forth.

Second, The combination of the hand, A, the arbor, B, the cam, C, the draft ratchet, D, the ratchet wheel, E, the tubular arbor, i, and the indicating hand, j, with each other in such a manner that the said hand, j, will indicate upon the face of the machine the number of games and half games played from a half-game to twelve games, substantially as herein set forth.

Third, The combination of the hand, A, the arbor, B, the cam, C, the draft ratchet, D, the ratchet wheel, E, the tubular arbor, i, the pinion, k, the toothed wheel, l, the pinion, m, the toothed wheel, n, and the tubular arbor, o, with each other and with the hand, p, in such a manner that the said hand, p, will indicate upon the face of the machine the number of games played from twelve to one hundred and forty-four, substantially as herein set forth.

64,001.—PLANE IRON.—Wm. H. Eckert, Syracuse, N. Y.

I claim the nut, n, in combination with the planing iron, A, the screw, s, and the cap, C, made and operated substantially as and for the purposes described.

I also claim the slot, h, in the cap, C, when made to fit upon the nut, n, and applied to planing irons substantially as described.

64,002.—GRAIN ELEVATOR AND DUMPING APPARATUS.—M. Eldridge and F. A. Reed, Alexandria, Va.

We claim, First, The platform, D, in combination with the swivels, m, which furnish pivots for the platform whereby it assumes alternate inclined and horizontal positions, substantially as described.

Second, The guide bars, n, in combination with the spring, o', and stops, O, as and for the purpose set forth.

Third, The hoisting and dumping apparatus consstructed as explained.

64,003.—HAY LOADER.—Wm. H. Elliot, New York City, assignor to John Kingdon, Washington, D. C.

I claim, First, The employment of an adjustable cord, l, between the arm of the crane and the fork, p, substantially as herein shown.

Second, The employment of pulleys, f and i, in combination with spring, k, and cord, l, for the purpose of taking up the latter after it has been drawn out, substantially as specified.

Third, Connecting together pawl, h, and bolt, e, so that any motion given to the former will move the latter, substanially as and for the purpose specified.

Fourth, So combining pawl, h, and bolt, e, with cord, l, that the latter shall operate the two former, substantially as set forth.

Fourth, Pivoting pawl, h, to movable arm, g, so that these devices may have a little motion around the center of the pulleys, substantially as herein shown.

64,004.—HAND CARD.—George J. Ells, Troy, N. Y.

I claim a hand card having a wooden stock so formed with a rib or ribs, b, as to thereby cover or protect the edge or edges, c, of the leather or other sheet-like material, D, which holds the teeth of the card, substantially as herein described.

64,005.—WINDLASS.—Richard H. Emerson, Fond Du Lac, Wis.

I claim a windlass having shaft, a, wheel, b, drum pulley, c, wheel, d, drum pulley, f, pulleys, g g', elastic, m, spring bar, l, levers, h h', arranged, combined, constructed and operating substantially as described.

64,006.—TOOL HANDLE.—Luther H. Farnsworth, Hudson, Mass.

I claim the combination and arrangement of the metallic shouldered prongs and the head constituting the stock, A, with the metallic collar, C, and the heart piece, B, the whole being made substantially as specified.

I also claim the stock, A, made with the head, the series of prongs, and the shoulders thereof, as described.

64,007.—LOW-WATER INDICATOR.—Lorenzo Fulton, Edinburg, Ind.

I claim, First, The arrangement of the pipe, D, in connection with the chamber, C, substantially as shown and described for the purpose of conveying a signal to a point at any desired distance, as set forth.

Second, The combination of the pipes, B C and D, with the disk, E, and trigger, J, substantially as and for the purpose set forth.

Third, The equalizing pipe, M, in combination with the boiler, A, and pipe, B, substantially as and for the purposes described.

64,008.—SHIFTING RAIL FOR CARRIAGE SEATS.—Frederick Baumgartner, Brooklyn, N. Y.

I claim securing the shifting rail, D, to the stationary rail, B, of the carriage seat, A, by means of hooks, F G, and screw buttons or clamps, H, substantially in the manner herein shown and described, and for the purpose set forth.

64,009.—SHEEP RACK AND SHELTER.—Dexter Gray, Upper Sandusky, Ohio.

First, I claim a portable stock shelter and feeding arrangement combining the arrangement of runners, a, troughs, K, grain boxes, I, hay racks, E, movable doors, g, plates, c, and cross timbers, d, substantially as described and for the purposes set forth.

Second, In combination with a portable stock shelter, I claim the double troughs, K K, with or without their separate chambers for each animal in combination with a grain box containing the bottom, o, slide, P, cut-off bottom, r', and lever, q, and partition, m, all constructed and operated substantially as described and for the purposes set forth.

Third, In combination with a portable stock shelter I claim the movable and transferable doors, g, for the purposes named

Fourth, In combination with a portable stock shelter I claim the movable racks, E, for the purpose set forth.

Fifth, I claim in portable stock shelters the combination and arrangement of troughs, K K K, and their grain boxes, I I I, with the racks, E E, as and for the purposes set forth.

Sixth, I claim, in combination with a portable stock shelter, elevating the hay racks and center feed troughs so as so secure all the ground room for the purposes set forth.

Seventh, I claim a grain feeding box for stock combining the sides, bottom, o, slide, P, cut-off bottom, r, lever, q, and openings, n, in each, for the purpose of feeding grain in measured quantities, as set forth.

64,010,—TOP PROP FOR CARRIAGES.—R. S. Grummon, Newark, N. J.

I claim the solid-headed screw, C, when used in combination with the socket, B, and thimble, D, constructed and operated substantially as described for the purpose specified.

64,011.—APPARATUS FOR BOILING, COOLING, AND FERMENTING MALT LIQUORS.—Thomas Haigh, Liverpool, England, and Robert Adam Robertson, Philadelphia, Pa., assignors to E. F. Prentiss, Wm. D. Philbrick and Wm. J. Parsons. Antedated April 9, 1867.

First, We claim dividing the supply cistern into several compartments and arranging a zig-zag air passage above the water communicating with the ash pit of a steam boiler, or other furnace for generating a draft of air over the surface of the water in the supply cistern, substantially and in the manner hereinbefore described and set forth or any mere modification of the same.

Second, The peculiar mode of constructing the double bottom of the wort boiling-pan, as hereinbefore described and set forth, or any mere modification of the same.

Third, Forming the refrigerator columns with small chambers at the top and bottom of the small vertical pipes, as hereinbefore described and set forth, or any mere modification of the same.

Fourth, The peculiar form and arrangement of the floating cover for the fermenting tuns, as hereinbefore described and set forth, or any mere modification of the same.

Fifth, The peculiar construction and arrangement of the various parts of the self-acting temperature regulating apparatus and the mode of counteracting the fluctuations in the pressure of the external atmosphere, as hereinbefore described, or any mere modification of the same.

Sixth, And lastly the general arrangement, combination, construction and use of the apparatus hereinbefore described and set forth, or any mere modification of the same, for the purpose of boiling, cooling and fermenting malt liquors or other useful purposes.

64,012.—BLAST FURNACE.—David U. Hendrickson, New York City.

I claim the arrangement of the boiler, A, hot-air tubes, d d, and hot-blast pipes, B1 B2 B3 B4, and stop cocks, c c, all substantially as described and shown in the accompanying drawings.

64,013.—FAN.—Lucian Hill, North Brookfield, Mass.

First, I claim a folding fan pivoted in the center, and operating as described.

Second, The combination of the fan part, A, with the branches, B B, of the handle, C, substantially as set forth.

Third, The combination with the fan part, A, and handle, C, of the loop or clasp, D, substantially as and for the purposes set forth.

Fourth, Making the handle, C, from two pieces, B B, united at both ends as described and cut or curved out to receive the fan part, A, as shown and described.

64,014.—OILER.—Gardiner L. Holt (assignor to himself and James M. Thompson), Springfield, Mass.

I claim the combination of the ring, B, and one or more bars, a b, arranged and constructed substantially as set forth.

64,015.—SHOE.—George Houghton, Hudson, Mass.

I claim the staying or fastening of sewed seams in the upper leathers of boots and shoes and other articles by means of a strip of thin metal extending on each side of the seam whether the same is folded or extends over the edge and grasps both sides of the leather or other material, or not.

64,016.—SELF-ACTING EYELET BATTEN.—Silas Land, Philadelphia, Pa.

I claim the combination of the slotted eyelets, C, with battens, B, arranged and operating in relation to signs or other boards, substantially in the manner described and for the purposes specified.

64,017.—STANCHION FOR CATTLE.—James Manley, Hope, Me.

I claim all the parts of Fig. 1 except the top and bottom pieces, A and B, of the common tie-up, that is, all the parts, C M I D E F G, which are connected together, and the said grooves, and said cut or mortise, H, and the thickened part of said top piece, B (to admit of said groove), and which make up the double swinging stanchion which swings both ways, which allows the animal fastened to turn the head either way, as before mentioned when standing or lying down and to lie on either side with ease and comfort.

64,018.—FASTENING OF WIRE OR WIRE ROPE TOGETHER.—Matthew F. Maury, Liverpool, Great Britain.

I claim the tie herein described and shown upon the drawings when the same is used to connect the ends of wire or wire rope that is employed in baling cotton or other like material, substantially in the manner set forth.

64,019. — MANUFACTURE OF AERATED WATERS. — George McCoy, New York City.

First, I claim a vessel for the manufacture of soda water or other aerated liquids, or for holding the same after being manufactured having its sides made of wood secured by iron bands or hoops and its two ends provided with metallic head plates joined together by stay rods or braces, and the whole constructed substantially as described.

Second, In the manufacture of soda water and other aerated liquids, discharging the water or other liquid into the vessel containing the gas or gases with which it is to be charged in the form of small jets or spray, or any other equivalent form, substantially as and for the purpose described.

64,020.—TOY.—John McMahel, Hamilton, Ohio.

I claim the cup, A, and ball, E, in combination with the spiral recoiling wire or spring, D, for guiding the ball to the cup, in the manner and for the purpose substantially as described.

64,021.—STEAM GENERATOR.—Truman Merriam and A. G. Allen, Waterloo, Wis. Antedated April 19, 1867.

First, We claim the combination of the cylinders, E F G, arranged in successive tiers above the furnace and connected by pipes formed in their end plates with a corresponding set of similar cylinders into which the steam is passed from the first set, and in which it is tempered by the introduction of water or oil, substantially in the manner and for the purpose set forth.

Second, The perforated or latticed metallic walls of the furnace when constructed and arranged substantially as set forth.

Third, The arrangement of the tank, C, induction pipe, H, pump, I, eduction pipes, K, and the furnace walls, substantially as set forth.

64,022.—BUTTONHOLE FOR PAPER COLLARS.—Joseph Merwin, New York City. Antedated April 8, 1867.

I claim the construction in collars of a buttonhole formed by holes of circular shape or thereabouts, at opposite ends of a connecting cut or slit, the edges of which constitute flaps or wings, substantially as specified.

63,023.—EXCAVATOR.—John Milroy, Edinburgh, Great Britain.

First, I claim the framework, 2, to the outer edges of which are hinged directly a series of spades, I, in combination with the within-described system of chains, A and B, the whole being arranged and operating substantially as and for the purpose herein set forth.

Second, The combination of the above with the hook, 7, constructed and operating in combination with the chains attached to the frame and to the spades, as described

64,024.—JOINT FOR CARRIAGE-TOP BRACES.—F. B. Morse, New Haven, Conn.

I claim the herein-described stump joint as an improved article of manufacture consisting in the combination of the two parts, A and B, when constructed and arranged together by a conical joint, substantially in the manner and for the purpose described.

64,025. — STEAM GENERATOR WATER GAGE. — George T. Parry, Philadelphia, Pa.

I claim the construction and arrangement of the plates, B C and D, whereby the water is shown in a thin sheet, substantially as set forth,

64,026.—BOILER FEEDER.—George T. Parry, Philadelpeia, Pa.

First, I claim, in combination with the generator, A, and feeder, B, the pipe, C, with its orifice, C', and the pipe, D, when arranged to operate substantially as described.

Second, In combination with the generator, A, and feeder, B, I claim the pipes, D and C F, and float, G, and valve, arranged to operate substantially as described.

64,027.—SMUT MILL.—Dan Pease, Floyd, N. Y.

I claim the spreader shown separately in Fig. 3 and as connected with the smut mill shown in Figs. 2 and 3, and fully described in the specification, the whole being constructed, adapted and arranged substantially in the manner herein set forth.

64,028.—COOLING MILK.—Watson Peck, York, Ill.

I claim the combination and application, as herein described.

64,029.—MACHINE FOR ROLLING DOUGH, CRUSHING SUGAR, ETC.—Gustavus Perkins, Burlington, Vt.

I claim the combination of the metallic rollers, h Q or R, the gages, m m, the arms, l l, as applied to the above purpose.

Also the construction of the entire machine, all as herein substantially described and for the purposes set forth.

64,030.—WHIFFLETREE HOOK.—S. M. Perkins, Morrison, Ill.

I claim the chambered cap, B, and washer, C, the said several parts being respectively constructed and the whole combined and arranged for use substantially in the manner and for the purpose set forth.

64,031.—WEATHER STRIP.—Jacob S. Peterson, Springdale, Ohio.

I claim the strip or flap, E, adapted to close against the rebate of the carpet sill by the impact of the cam, K, and roller, D, and to be retracted by means of a spring, M, substantially as set forth.

64,032.—METHOD OF REMOVING BUILDINGS.—Thomas W. Prather, Iowa City, Iowa.

I claim the combination of the truck wheels, crank, cog wheels, shaft, platform and screw, substantially as and for the purpose set forth.

64,033.—FILE-CUTTING MACHINE.—Alexander N. Redman, Charlestown, Mass.

First, I claim the combination of the guide frame, E, the pinion, C, and rotating rack gear, B, as described.

Second, I claim the sliding block or bar, H, provided with the pawl, I, the adjustable projection, h, and retracting spring, I, in combination with the rotating rack gear, B, substantially as and for the purpose specified.

Third, I claim the combination of the yoke, P, adjustable block, N, or its equivalent, and the cutter, O, operating as described substantially as and for the purpose set forth.

Fourth, I claim the combination of the springs, S S', arranged as described with the cutter head, M, as and for the purpose specified.

64,034.—FARM GATE.—John H. Reinhart, McKay, Ohio.

I claim the arrangement construction and combination of the wheel, D, movable bolt, J, and projections, E E, so that the gate operates in the slots, G and H, of the post, F, as herein described and for the purposes set forth.

64,035.—MACHINE FOR MAKING NAILS.—Samuel G. Reynolds, Bristol, R. I. Antedated April 8, 1867.

I claim making the heads of nails, bolts, rivets, etc., by a number of consecutive upsets of a long piece of metal, by liberating or uncovering from the inclosure of the die more and more of the metal as the header advances to upset the same by means of successively receding sections of which the die is in part composed, or their equivalents, substantially as described.

I also claim the sliding block substantially as described in combination with the compound griping or molding die, the springs, g1 g2, and heading lever, or their equivalents, as described, for the purpose of operating the movable sections of said die, substantially in the manner and with the effect herein set forth and described.

64,036.—CAR BRAKE.—J. W. Rice, Springfield, Mass.

First, I claim in a brake for cars the combination of the drum, I, having the spring, L, ratchet, K and J, and the sleeve, F, having the spring, L, attached to it, and the ratchet, G, with the sleeve, B, having the pawl, f, the whole arranged substantially in the manner and for the purpose set forth herein.

Second, In combination with the above arrangement the pawls, g and h, and dogs, O and P, to operate the pawls, the same constructed and operating substantially as described.

Third, In combination with the drum, I, the device for turning the same consisting of the shaft, h, cog, M, and crank, z, substantially as shown and described.

Fourth, In combination with the sleeve, B, provided with the cog wheel, C, I claim the wheel, D, and shaft forming a windlass for the brake chain.

Fifth, The equalizers for brakes herein shown, in which the chain passes around two or more pullies, 1 2 3 4, arranged in a frame, S, having slots, 7, in it, into which works a pin, 8, substantially as shown and described.

64,037.— MACHINE FOR MAKING WOODEN PINS.— George Rowe, Worcester, Mass.

I claim in combination with the removable punch or cutter, E, of the hollow stem or handle, A, slotted as described, so as to facilitate the withdrawal of the pins, and the removal of the punch, and otherwise constructed and arranged for operation as herein set forth.

64,038.—MACHINE FOR MAKING BOOK COVERS.—Marshall Rumrell and Robert H. Rumrell, Brooklyn, N. Y.

First, We claim the means herein described for taking up stiffening papers one by one, and securing the same to the inside of book covers, substantially as and for the purpose herein set forth.

Second, The means herein described for cutting the cover at all the necessary points at once, substantially and for the purpose herein set forth.

Third, The means herein described of folding over the edges of the cover and securing the same firmly to the stiffening paper, substantially as and for the purpose herein set forth.

64,039.—CHIMNEY HOLDER FOR LAMP BURNERS.—Thomas Ryder, Providence, R. I.

I claim the combined spring and clasp, in combination with the lamp burner, for the purpose all substantially as specified.

64,040.—CAR BRAKE.—James Sheward and George A. Stanbery, Dunkirk, N. Y.

We claim the application of the worm or endless screw to the axle of any

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vehicle where the axle revolves in combination with a cog-wheel to produce a slow motion under a high speed, and face plate forced upon the face of the cog-wheel as described herein, for the purpose set forth.

64,041.—SIDE BOARD FOR TRESHING MACHINES.—Ballard C. Smith, Ashland, Ind.

First, I claim the jointed side board, constructed of light sheet metal or other material hinged at E E, with permanent end, D, and movable end, C, by means of which all effects of winds are avoided on the stacker, substantially as and for the purposes set forth.

Second, I claim the spring, F, and catch, G, for the purposes of keeping the sections, A and B, in line, and for displacing the said sections when operated by cords, H, substantially as and for the purpose set forth and shown when stacker is attached to machine in the usual manner, by rod, M.

64,042.—WEATHER STRIP.—George W. Smith, Strasburgh, Ohio.

I claim the hinged strip, a, in combination with spring, g, and metal strip, e, constructed as described, and the whole arranged as and for the purpose set forth.

64,043.—STEAM ENGINE PISTON.—J. Y. Smith, Pittsburgh, Penn.

First, I claim the central groove, a, provided with the apertures, n, for admitting the steam or other material to the under side of the rings, substantially as shown and described.

Second, The combination of the ring, c and e, with the flanges, A', and plate, B, or their equivalents, when arranged and operating as and for the purpose set forth.

64,044.—SEAT AND BACK.—Mortimer L. Smith (assignor to himself and J. W. Houghtelin), Detroit, Mich.

I claim the combination of the strips, C C, back, E E B, seat, A G G, and frame, H D, all arranged as and for the purpose described.

64,045.—GUN HARPOON.—Robert E. Smith, Provincetown, Mass.

I claim the head, A B, grooved to receive the pivoted barb, C, and cast in one piece with the slotted shank, D, the latter being provided with the elastic guard, g, and the wire link, E, all constructed and operating substantially as described, and for the purpose set forth.

64,046.—KNOT INDICATOR FOR KNITTING MACHINE.—John F. Steward, Plano, Ill.

I claim the arm, C, with the knot grasper, B, hammer, D, and the spring, E, in combination with the bell, A, constructed and operating as herein described.

64,047.—COMPOSITION FOR PRESERVING EGGS.—P. J. Stouffer, Uniontown, Penn., assignor to himself and Henry White.

I claim the composition for preserving eggs, substantially as set forth.

64,048.—BEDSTEAD FASTENING.—George Sugg and W. Metz, Chicago, Ill.

We claim as a new article of manufacture the bed fastening, consisting of the plate, A, constructed as herein described, and used in combination with the plate, E, provided with the arms, O, with the enlarged heads, I, as herein set forth.

64,049.—MACHINE FOR FELTING HATS.—James Walber, Washington, D. C.

First, I claim the combination and arrangement in a machine for felting hat bodies of two or more pairs of rollers, having a rotatary movement, when each successive pair revolves with a diminished speed, all substantially in the manner and for the purpose as herein set forth.

Second, The combination as above of two or more pairs of rollers, whose diameters so vary that the circumference of each successive pair shall revolve with diminished speed, substantially in the manner and for the purposes herein set forth.

Third, The combination in a felting machine of a series of pairs of rollers, each pair of which has a lesser velocity than the preceding pair, with a series of pairs of rollers having an uniform velocity, as and for the purpose herein described.

Fourth, The combination in a felting machine of a series of rollers supported in a fixed frame, but each having an independently lateral play in its bearings in the line of its axis, substantially as and for the purpose herein described.

Fifth, Imparting a lateral reciprocating movement to the rollers of a machine for felting hat bodies by means of cams on the ends of said rollers, or their journals, bearing against suitable cam surfaces when each of said rollers has free play independently of the others in the line of its axis, all substantially in the manner and for the purpose herein set forth.

Sixth, The use of a series of hollow rollers in a felting machine with suitable steam pipes for introducing steam into the same when said rollers revolve successively with a diminished speed, substantially in the manner and for the purpose herein set forth.

Seventh, The combination of a reversing roller, placed centrally in front of the last pair of rollers in a felting machine, with an auxiliary roller placed over the same, to bear thereon, and operate conjointly therewith, substantially in the manner and for the purpose herein set forth.

Eighth, The combination of a single endless chain and toothed wheels, with two series of rollers in a felting machine, substantially as and for the purpose herein described.

Ninth, The combination of suitable springs, with the sliding journal boxes of the driving shaft, and with an endless chain working thereon, all substantially as and for the purpose herein set forth.

64,050.—HAY STACKER.—Samuel Jacob Wallace, Keokuk, Iowa.

I claim a portable hay stacker having the several parts thereof constructed, arranged and combined as and for the purpose set forth.

64,051.—SPOOL HOLDER FOR SEWING MACHINES.—William Wheaton (assignor to John F. Lee, Jr.), Brooklyn, N. Y.

I claim the cylinder. A A', spring, s, or its equivalent, screw, c, horizontal plates, d and e, combined and operated in the manner and for the purpose set forth, and shown in the accompanying drawings.

64,052.—STEAM ENGINE PISTON.—Jerome Wheelock, Worcester, Mass.

First, I claim the combination of stay bolts, E E E E, with a piston head, substantially in the manner herein described.

Second, A piston constructed with an oblong hole or aperture through its center, to receive the piston rod, substantially as and for the purpose described.

Third, The slot in the piston rod, B, when used for the purpose of relieving the nut in the manner substantially shown and described.

64,053.—NEEDLE WRAPPER.—John William Whitfield, New York City.

I claim a needle wrapper, composed of a sheet of fabric, combined with a series of thread loops to hold the needles to the fabric, substantially as set forth.

64,054.—SELF-OILING JOURNAL BOX.—John Whitlock, Birmingham, Conn.

I claim in combination with a shaft or journal, having a wheel, disk or ring attached to that portion that revolves in the journal box, and with distributors for carrying the oil over the shaft or journal the vertical end passages, and horizontal passages leading from said ends back to the recess or reservoir, for the purpose of making a self-oiling device, substantially as described.

64,055.—ROTARY HARROW.—Albert H. Acken, Griggstown, N. J.

I claim the frame, A", when constructed as described, in combination with the jointed teeth, B', center pin C", and draft rod D, all arranged and operating as specified.

64,056.—LAMP BURNER.—J. B. Alexander, Washington, D. C.

I claim the wick-holder, composed of the corrugated plates O and P, with their turned edges and indentations, K K K K K K K K, and the slot, G, substantially as and for the purpose set forth.

I also claim, in combination with the above described wick-holder, the device for racing and lowering the wick, substantially as and for the purpose set forth.

I also claim the device, L M, for filling the lamp fountain with oil, in combination with the burner, substantially as described, and for the purpose set forth.

64,057.—MACHINE FOR CULTIVATING COTTON.—William Altick, Dayton, Ohio.

First, I claim the arrangement of the shaft, C, with its clutch and bevel wheel, with the pinion, T, shaft, W, and wheel, N, provided with its adjustable hoes, the several parts being constructing and used as and for the purpose specified.

Second, Adjusting the arms, O O, in the wheel, N, by means of their grooves and the pins, b b, substantially as and for the purpose specified,

Third. The bar, H, upon which the plows or cultivator teeth are secured, used in connection with the grooved plates, a a, rockshaft, k, with its arms and lever, J, substantially as and for the purpose specified.

64,058.—MODE OF TREATING FLAX.—Albert F. and John H. Andrews, Avon, Conn.

First, We claim treating it by the aid of the endless double network arranged relatively to the rollers "G H", and to the tank substantially as and for the purpose herein specified.

Second, We claim, in combination with the above, subjecting it to the action of the pressure roller, J, arranged as represented.

Third, We claim the alternate application of warm and cold water, substantially in the manner and for the purpose herein described.

Fourth, We claim the treatment in the soluble protein solution obtained from ground beams or other equivalent, substantially as specified.

Fifth, We claim the treatment with the chloride of sodium, or its equivalent, after the treatment with the alkali before the bleaching, substantially as herein specified.

Sixth, We claim the employment of metallic chlorides in the bleaching bath substantially as and for the purpose herein specified.

Seventh, We claim blowing atmospheric air through the interstices, after the material to be bleached has been immersed in a solution containing chloride of lime, whether this solution is prepared in the ordinary manner, or as above described.

Eighth, We claim the use of alkaline solutions after bleaching, substantially as and for the purpose herein specified.

Ninth, We claim the treatment with urine, in connection with the treatment with soap, substantially as and for the purpose herein specified.

Tenth, We claim the treatment with cider or equivalent vegetable acid solution at the termination of the process.

Eleventh, We claim the use of atmospheric air forced through the flax, in connection with an alkaline solution, saturating the flax, as a bleaching and disintegrating agent, substantially as herein specified.

64,059.—RANGE AND AIR HEATING FURNACE.—William H. Armstrong, New Brunswick, N. J.

I claim the arrangement of the cooking range it appurtenances, A B C F G, flue, H, chambers, I M M, air passages, E E, water back, D, and auxiliary pipe, O, as herein described, and for the purpose specified.

64,060.—QUARTZ CRUSHER.—Robert Bailey, Idaho City Idaho.

First, I claim the construction of the rotary mortar bed enclosed within the case, A, made of blocks of rock, b b b, forming inclined planes of irregular dimensions on their inside surfaces combined with cast iron dies, c c c, fitted in and secured to them, arranged and applied as and for the purpose herein described.

Second, I claim the cubical stamp, d, in combination with the revolving mortar bed constructed and operated together in the manner and for the purposes herein set forth.

64,061.—CULTIVATOR.—Jacob Bergen, Canton, Ohio.

I claim, The arrangement of the crank axles, D D, with the levers, H, spring, d, and guides, I and J, substantially as and for the purpose specified.

64,062.—WINDOW SHADE.—Adoldh Binner (assignor to himself and John Leuzinger), Muscatine, Iowa.

I claim a window curtain or shade composed of round sticks of wood connected together, substantially as described.

64,063.—CLOTHES LINE.—J. W. Bliss, Hartford, Conn.

I claim a clothes line of cord, leather or wire coated with india-rubber, or gutta-percha to protect the same from the weather, all as and for the purpose specified.

64,064.—LUBRICATING JOURNAL BOX.—Samuel F. Bond, Worcester, Mass.

I claim a self-lubricating journal box constructed substantially as described with a chamber or chambers forming oil reservoirs along either side of the journal also provided with lower supply apertures and their upper inner edges made to form scrapers or cleaners for removing surplus oil and to return it to the reservoirs essentially as herein set forth.

64,065.—FRUIT DRYER.—John K. Boswell, Richmond, Ind. Antedated March 16, 1867.

I claim, First, The revolving triangular heater, D, arranged as and for the purpose set forth.

Second, The shield, b, when provided with apertures and arranged substantially in the manner and for the purposes specified.

Third, The combination of the furnace, N, when provided with tube, i, or its equivalent, the revolving triangular heater, D, when provided with tube, j, or its equivalent, and the chimney, K.

Fourth, The siding panel, C, substantially in the manner and for the purpose described.

64,066.—CHILD'S TOY.—Lucy Broad, St. Louis, Mo.

I claim the combination of the figures, C1 C2, with the circular plate or race track, C, and with the actuating machinery as described and set forth.

I also claim the bell, B' in combination with the other parts as described and set forth.

64,067.—CARRIAGE THILL COUPLING.—J. J. Brown, Madison, Wis.

I claim, First, The bar, A, provided with the vertical arm, B, for attaching the button independent of the clip or band substantially as and for the purpose set forth.

Second, Making the socket for the reception of the packing and bolt between the front side of arm, B, and the front curved end of A, as shown and described.

64,068.—ROTARY STEAM ENGINE.—S. H. Brown, New York City.

I claim, First, The abutment or valve, E, constructed as described and pivoted so as to vibrate in either direction, substantially as and for the purpose specified.

Second, The semi-cylindrical reversible stops, i, in combination with the hinged abutment, E, annular rims, a, and piston wheels, C, with pistons, D, all constructed and operating substantially as and for the purpose set forth.

64,069.—BRICK MACHINE.—John W. Burns, Henry, Ill.

I claim operating the plungers, I I, through the medium of the shaft, F, connected by arms and links to vertical racks, G, pinions on segments, H, provided with arms, e, and the arm, E, on shaft, C, all being arranged substantially as herein shown and described.

Second, The arrangement of the mud mill, A, plungers, I I, and molds, J, substantially as herein set forth.

Third, The feeding of the empty molds to receive the clay, and the discharging of the filled molds from the press by means of the racks, N, and pinions, O, substantially as shown and described.

64,070.—STEAM SAFETY VALVE.—Thomas H. Burridge (assignor to himself and G. C. Fabiam), St. Louis, Mo.

I claim the levers, E F, constructed and arranged in relation to each other and valve substantially as and for the purpose set forth.

64,071.—DRAW BAR FOR LOCOMOTIVES.—D. C. Cannell, La Fayette, Ind.

I claim a draw bar, A, provided at one end with V-shaped recesses b, one at each side with a link, B, fitted in it and working within the recesses, substantially in the manner and for the purpose set forth.

64,072.—VALVE FOR STEAM ENGINES.—Charles E. Case, Xenia, Ohio.

I claim the valve, C, and spiral pin, H, constructed and arranged substantially upon the principle and in the manner herein set forth.

64,073.—SHOEING HORSES.—Pierre Charlier, Paris, France.

I claim the method herein described or attaching the shoe to the hoof of a horse or other animal by letting said shoe into a recess cut into the edge of the hoof, substantially in the manner and for the purpose set forth.

64,074.—WINDOW SASH FRAME.—Edwin Clark, Lancaster, Pa.

First, I claim the inclined tongue, d, and corresponding groove, c, on the pieces, b and b', respectively of a window sash, substantially as and for the purposes described.

Second, The projections, d',, on the inclined tongue, d, slots, c1, springs, d2, and eyes, c2, on the pieces, b and b' respectively, of a window sash, substantially as and for the purpose described.

Third, The eyes, g' on the strips, g, and pins, j, passing through the same and the window frame, substantially as described.

Fourth, The tongue, g2, on the strip, g, and corresponding groove in the frame, A, substantially as and for the purposes specified.

Fifth, The above described mode of removing and replacing window sashes from frames, substantially as and for the purposes specified.

64,075.—LANTERN.—P. J. Clark and Joseph Kintz (assignors to Samuel S. Clark), Meriden, Ct.

First, I claim the guards, D, any suitable number constructed each of one piece of wire bent or doubled, attached to the cap, B, and arranged so as to retain the glass globe, F, substantially as set forth.

Second, The connecting of the lower end of one of the guards, D, to the base, A, to form a hinge or joint, c, with a catch or fastening, e, secured to the base, A, to catch over the lower end of the guard which is in line with it, substantially as shown and described.

64,076.—CORN PLANTER.—John Clarridge, Pancoastburgh, Ohio.

First, I claim the steel plow, H, when constructed and attached to the shank, I, substantially as herein described and for the purpose set forth.

Second, The combination of the slide bars, M, the inclines, F' or equivalent arms or levers, D' and valves, B' with each other and with the plow frame, E, substantially as described and for the purpose set forth.

Third, The combination of the circular valve, I' with the seed reservoir, T, hopper, S, and sliding bar, M, substantially as herein described and for the purpose set forth.

Fourth The combination of the upwardly projecting pins, J' with the valves, H' or I' and with the seed reservoir, T, substantially as herein described and for the purpose set forth.

Fifth, The combination of the vertical stirring shaft, K' having horizontal arms with the seed reservoir, T, hollow shank, I, and with the sliding bar, M, substantially as described and for the purpose set forth.

Sixth, The coupling, G, when constructed substantially as herein described and for the purpose set forth.

Seventh, The combination and arrangement of the seed reservoir, T, hopper, S, arms, V, levers, W1, W2, and connecting rods, A1 A2, with each other with the sliding bar, M, and with the plow frame, E, substantially as herein described and for the purpose set forth.

Eighth, The combination of the lever, O and P, and sliding bars, M, with each other, with the plow frames, E, and with the frame, A, of the planter, substantially as described and for the purpose set forth.

Ninth, The combination of the cords, X', pulleys, B2, shaft, V' ratchet wheel, Y' pawl, Z' bevel wheel, U' and foot wheel, S', with each other, with the plow frames, E, and with the frame, A. of the planter, substantially as herein described, and for the purpose set forth.

Tenth, The combination of the lever, P' slide bar, N' and bent lever, M' or equivalents with each other with the slide bars, M, and with the frame, A, of the planter, substantially as described and for the purpose set forth.

Eleventh, The combination of the shovel plow, I, and strengthening rods, h3, with each other and with the flanged lever end of the hollow shank, I, substantially as described and for the purpose set forth.

Twelfth, Constructing the hollow shank, I, with a double convex head, i1, cast upon its upper end and a projecting flange, i2 and arms, i3, upon its lower end, substantially as described and for the purpose set forth.

Thirteenth, Placing the seed reservoir, T, directly above the hoppers, S, and cutting away the side of said hoppers, substantially as described and for the purpose set forth.

64,077.—FEEDING MECHANISM FOR CARDING MACHINES.—William Clissold, Dudbridge Works near Stroud, Eng.

First, I claim the combination with the inclined reciprocating bars, B, of the reciprocating comb bars, F, and rods or pressers, K, for the purpose of discharging the wool or other fibrous material from the feeding box.

Second, The combination with the reciprocating comb bars of pressing rolls, P, for delivering the wool or other fibrous material to the preparing machine in the form of a bat or sheet.

64,078.—ROLLS FOR YARN DRESSING MACHINES.—Benjamin R. Cotten, Lewiston, Me.

I claim a dresser roll having a metal coated surface, substantially as set forth.

64,079.—PAPER FILE.—Lewis B. Covert, Chicago, Ill.

I claim the file or binder formed of the cover, a, and slides, b, in combination with the perforated clasps, c, as and for the purpose specified.

64,080.—POTATO DRILL.—John Croco, Holmesville, Ohio.

First, I claim the disks, F F', constructed and arranged in combination with the guide or tension pulley, J, and pulley, H, for the purpose and in the manner set forth.

Second, The disks, F F' hopper, L, in combination with the tube, E, and shovel, K, as and for the purpose described.

64,081.—EXERCISING CLUB.—John L. Dibble, New York City.

I claim the metallic cylindrical shell, A A, and the central rod, D D D, as arranged and combined with the blocks, B B and C C, and adjustable weights, F F, the whole forming an exercising club, substantially as herein described and set forth.

64,082.—CARRIAGE FOR CHILDREN.—Alexander Dick, Buffalo, N. Y.

First. I claim a carriage body formed and constructed of wire, substantially as described.

Second, In combination with a carriage, a seat made adjustable, substantially as described.

Third, The arrangement in a carriage of the springs, W W, and D D, substantially as described.

64,083.—HORSE HAY FORK.—L. M. Doudua, Elmira, N. Y.

I claim the tube, A, and sleeve, E, in combination with the spring, F, tines or teeth, C, lever, G, and link, H, all arranged to operate in the manner substantially as and for the purpose specified.

64,084.—CARPET WADDING.—Thomas H. Dunham, Boston, Mass.

I claim a wadding or fabric, having an adherent border or selvedge formed of the sheets of paper that project beyond the edges of the batting, and attached to each other as herein specified without the use of gum or other adhesive substance, substantially as described.

64,085.—GAME REGISTER.—John Enright, Louisville, Ky.

I claim the construction and arrangement of the arm, G, working loosely on shaft, d' having tooth, K, upon its inner end and provided with the double pawl, H, spring, P, indicating finger, T, its lower end working through the slotted segment, R, attached to the frame, A, toothed wheel, D, toothed sector, J, bearing the indicating finger, L, springs, O O I, and indicating fingers, F, substantially as herein shown and described.

64,086.—CULTIVATOR.—Oliver Etnier, Mount Union, Pa.

I claim the combination of the guide blade or rudder, D, placed on the rear of the projecting center beam, B, and the handles, C C, attached to the cross beams, a b, arranged and operating substantially as and for the purpose herein described.

64,087.—CAR SPRING.—James W. Evans, New York City.

I claim the spiral surface grooves, c and e, for the reception of the terminal coils of the spring cast in the bottom of the box, A, and head of its cover, C, or in any other cast metal bearings provided for the spring, substantially as herein specified.

64,088.—TICKET FASTENER.—Samuel B. Fay, Franklin, Pa.

I claim the loop wires, D, twisted and crossing each other for the purpose described, as a new article of manufacture.

64,089.—NICKING SCREW HEADS.—Edward B. Fish, Glen's Falls, N. Y.

I claim a nicked screw provided with a cavity, b, in its head, substantially as specified.

64,090.—AIR HEATING APPARATUS FOR STEAM BOILER FURNACES, ETC.—Addison C. Fletcher, New York City. Antedated April 18, 1867.

I claim the air passage or passages, E, extending transversely across and through the smoke pipe, chimney flue or exhaust pipe for the whole or nearly the whole length of, and in combination with the jacket, D, surrounding the said pipe, chimney or flue, substantially as and for the purpose herein specified.

64,091.—RIDDLE FOR SAND WASHER.—D. L. Furnier, Rostraver Pa.

I claim a hollow screen or riddle, revolving on an axis, with one portion always immersed in a vessel through which a stream of water constantly flows, when said riddle receives the earthy sand into its interior at one end and discharges the coarser particles over a tail chute at the other end, as set forth and described.

In combination with a hollow revolving riddle, constructed substantially as described, and revolving in a water trough, B, the chute, M, and stirrers, N N, for the purposes set forth.

In combination with a hollow revolving riddle, constructed substantially as described, the web, P, and tail spout, L, for the purposes set forth.

In combination with a hollow revolving riddle, constructed substantially as described, the wings, O O, upon its outer side, to agitate and remove the sand from the trough, as set forth.

The combination of the hollow revolving riddle and bed frame, A, provided with the trough, B, and waste chute, C, constructed and arranged as set forth and described.

64,092.—CARPET LINING.—William Fuzzard, Chelsea, Mass.

I claim as a new article of manufacture, a carpet lining constructed of stiff paper, pasteboard, or a sized textile, or other suitable fabric, bent, corrugated. or folded, to effect the result, substantially as herein set forth.

64,093.—HAY AND COTTON PRESS.—Joel Garfield, Groton, Mass.

I claim, in combination with the follower, the grooves or ways at the ends of the press and their sliding pins, the vertical ratchets and their double set or sets of pawls and the toggle levers, when so arranged that an intermittent progressive movement is imparted to the follower by their co-operative movements, substantially as set forth.

Also, in combination with the follower, the hinged frame, d, by which the follower may be swung up to leave the press open, substantially as set forth.

64,094.—STREET PAVEMENT.—George W. Grader and Matthias H. Baldwin, Memphis, Tenn.

We claim interlocking the sections of the frame, A, by means of the protecting flanges, c, on every alternate corner of each section, fitting into a recess, b, under the corner of the opposite section, thereby preventing the pavement from settling or getting out of line, as herein shown and described.

64,095.—COMBINED FENCE AND GATE.—C. S. S. Griffing, Geneva, N. Y.

I claim the pannel, G, arranged as described, and in relation to the pannels, A A, and braces, B, when combined so as to form a gate and pannel, jointly, in the manner and relatively as specified.

64,096.—FRUIT GATHERER.—Jacob B. Haines, Millersville, Pa.

I claim the arrangement of the fingers, A, lever arms, E, in combination with the coiled springs, D, all surrounding a rigid shaft, B, centrally affixed to the top of the pipe, R, and also connected with the horizontal and vertical bows, I K, the latter connected by cross curves, L M N, operating jointly in the manner and for the purpose specified.

In combination with the specific frame work, I also claim the use of a sleeve or bag, N, elastic bands, O, buttons, P, actuating wire, F, cord, H, and handle, S, all arranged and operating in the manner and for the purpose set forth.

64,097.—POTATO DIGGER.—Manly Hall, Livonia, Mich.

I claim, First, The scoop, E, grating, f, and bars, M, as arranged in combination with the elevator, as constructed of the belts, L, and cross ties, L', armed with the teeth, a, and the rake, Q, for the purpose and in the manner substantially as set forth.

Second, The sieve, N, conductors, P P', when arranged and operated conjointly in combination with the elevator and rake, Q, and scoop, E, as and for the purpose substantially as herein described.

64,098.—VOLTAIC BRACELET.—Thomas Hall, Boston, Mass.

I claim the series of plates, of different metals, attached to each other by double hooks, formed upon one side of each plate, and entering corresponding slots cut at the opposite edge of each plate, the hooks being passed through the leather or cloth strap, and clinched upon the side opposite to the plates, substantially as herein described.

64,099.—APPARATUS FOR THE MANUFACTURE OF SOAP.—Cyrus H. Hardy, Charlestown, assignor to himself and Geo. Jaques, Boston, Mass.

I claim placing the several soap-forming ingredients in separate and independent receptacles, D E F, with or without steam jackets, and provided with pipes, e f g, for conducting the ingredients to the receptacle, G, in which they are heated, the supply of the ingredients thereto being regulated by suitable valves or stop cocks, h i j, substantially as and for the purposes specified.

I also claim, in connection with the above, the employment of agitators, I J, operating substantially as set forth.

64,100.—HORSE HAY FORKS.—Samuel and Daniel A. Harris, Shippensburgh, Pa.

We claim pivoting the lever, E, to the forked arm, F, of the bar, A, and to the lever, D, as herein described, in such a manner that the weight upon the finger, C, will cause the upper end of the lever, E, to be drawn toward said bar, A, thereby securing and retaining the finger, C, in a horizontal position, as herein shown and described.

64,101.—WINDOW SHADE ROLLER.—Stewart Hartshorn, New Tork City.

I claim the construction and arrangement of the short fixed shaft, E, above the shade roller, A, surrounded by the spiral spring, D, one end of which is secured thereto at, b, the other end attached to the loose hub, F, of the gear wheel, C, meshing into the gear wheel, B, upon the end of the shade roller, substantially as herein shown and described for the purpose specified.

64,102.—AUXILIARY AIR CHAMBER FOR STOVES.—Elizabeth Hawks, Troy, N. Y.

I claim the shield, A, with the open horizontal slot, B, near its top, constructed and used as and for the purpose set forth.

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64,103.—PONTOON BOAT.—John Hegeman, Vischer's Ferry, N. Y.

I claim the combination of the hinged parts consisting of the bottom, A B. the end sections, C, central sections, F, and side end sections, H, when the sides and end sections are so constructed as to fold over on the bottom of the boat, in the manner described.

64,104.—HORSE HAY-FORKS.—Thos. N. Henderson, Jackson, Mich., assignor to Henderson & Cooley.

I claim the combination of the adjustable drop, C, rolling cross bar, C, and operating lever, E, with each other and with the handles, G', and teeth, I, of the rake, substantially as herein shown and described and for the purpose set forth.

64,105.—LUBRICATOR FOR MACHINERY.—Benj. Hilbert, Cincinnati, Ohio.

First, I claim the transparent reservoir consisting of a glass globe, A, in which the decrease of the lubricating material may be observed without detaching it from the bearing, and allowing of its insertion in an inclined position.

Second, A conducting pipe, E, with its end resting upon the journal or other moving metal, so that the surface of said metal closes the orifice when at rest and when in motion acts mechanically to draw out a sufficient quantity of oil, as herein set forth.

Third, A lubricating apparatus constructed in two portions, one permanently attached to the box or in other desired position, while the reservoir and conducting pipe are simply inserted in this outer pipe so as to be removable at pleasure.

Fourth, The arrangement of screw-threaded outer pipe, G, and pinching nut, I, to enable the adjustment of the tubes, as shown and set forth.

64,106.—STUMP EXTRACTOR.—J. Dean Huffman, Springfield, Ohio.

First, I claim the lever, A, of a stump puller, in combination with the cylindrical fulcrum, B, supporting the wheels, C, eccentrically attached thereto, substantially in the manner and for the purpose set forth.

Second, In combination with the slotted lever, A, eccentrically attached, the fixed cylindrical fulcrum, B, adjustable extension hook, D, and stirrup, E, when constructed and arranged substantially as set forth.

Third, The arrangement of the slotted lever, A, with the plate, A2, and bite, A3, a ustable extension hook, D, and chain, F, and eccentrically attached fixed cylindrical fulcrum, B, substantially as set forth.

Fourth, In combination with the lever, A, eccentrically attached fixed cylindrical fulcrum, B, and stirrup, E, I claim the hooked clevis, x, substantially as and for the purpose set forth.

64,107.—MACHINE FOR BLOCKING AND STRETCHING HAT BODIES.—Wm. Humphreys, Jr., Cold Spring, N. Y.

First, I claim a series of stretchers, O, in combination with the levers, F, for the purpose of overstretching the brim, substantially as described.

Second, Making the said stretchers adjustable vertically so as to regulate the extent of stretching, substantially as described.

Third, The combination of a series of levers, F, hinged to the base plate, D, springs, I, and levers or clamps, G, rods, H, and plate, I, constructed and operating substantially as described.

Fourth, The sleeve, J, which carries by means of its connections the wedge, M, for operating the levers, N, made adjustable in a vertical direction, substantially as set forth.

Fifth, A series of levers, N, hinged to the stationary base plate, D, in combination with the circular wedge, M, adjustable sleeve, J, and its connections, arranged and operating substantially as described.

Sixth, The combination of rods, Z Z', catches, j, springs, k, pins, r, slotted levers, Y, and shaft, W, arranged to operate the cylindrical cap piece, E, substantially as described.

Seventh, In combination therewith the lever, a rods, d and c, wheel, U, and its pin, m, for governing the operation of the same, substantially as described.

Eighth, The arrangement of the hand lever, e, with the projection, t, and stop, o, on the rod, Z', in combination with the tappet arrangement of the pin, n, on wheel, U, and the projection, q, on rod, f, constructed and operating substantially as set forth.

Ninth, The base plate, D, to which are hinged the levers, F, in combination with the cylindrical cap piece, E, carrying the brim stretchers, O, the whole arranged and operating substantially as and for the purpose set forth.

Tenth, The lever, F, having its journal arranged to operate with base plate, D, substantially as described and for the purpose set forth.

64,108.—GATE.—A. B. Hurd, Watkins, N. Y.

First, I claim the bar, B, pivoted on the cleat, n, and having its rear end engaging with the hook, b, as a support for the gate, A, substantially as shown and described.

Second, I claim mounting the gate, A, on friction rollers arranged to r n on the bar, B, and having both gate and bar swing around, as set forth.

Third, The staples, d, with the friction rollers mounted thereon, and said staples arranged to embrace the bar, as shown and described.

64,109.—SASH-ROPE PLATE.—Anthony Iske, Lancaster, Pa.

I claim the specific arrangement of the plate, A, with its circular opening, B, slot, C, groove, D, and beveled convexity, E, on the back, all arranged in the manner and for the purpose speci ed.

64,110.—BOAT-DETACHING TACKLE.—Peter H. Jackson, New York City.

I claim the cylinder, g, feather, i, lever, k, and fork, h, in combination with the bolts, e e, having right and left handed threads, said bolts taking eyes or rings on the ropes or chains passing to the davits, as set forth and for the purpose specified.

64,111.—HAY ELEVATOR.—Jacob L. Kintner, Harrison, County, Ind.

I claim the guide bars, F F, having their lower ends connected to a curved plate, in combination with the rake, G, and bars, A A, all constructed and operating in the manner and for the purpose set forth.

64,112.—SHOWER BATH.—D. P. Lacy, Orfordville, Wis.

I claim, First, Constructing and operating the valve substantially as and for the purpose set forth.

Second, The valve arrangement constructed as specified in combiuation with a vessel for containing water, substantially as set forth.

64,113.—COMBINING GENERATING AND SECONDARY OR ACCUMULATING GALVANIC BATTERY.—Georges Lionel Leclauche, Paris, France.

I claim in combination the graphite plate or plates, the flask, and the porous vase, the flask and vase being charged and the whole apparatus being arranged to operate substantially as set forth.

I also claim the employment in electrical piles of peroxide of manganese moistened with a liquid containing a salt in solution which has no chemical action on the peroxide of manganese, the salt used being capable by its electrolytical decomposition of rendering soluble the oxides of manganese arising from the reduction operated by the hydrogen.

64,114.—POTATO DIGGER.—Edward S. Lenox and Edward Spaulding, New York City.

We claim, First, The potato digger, consisting of the frame, A, secured to the axle, B, caster wheel, D, suspended scoop, E, with wings, G G, curved bars, h, riddle, F, vibrated by suitable gearing, N, cutter, H, mold board, I, toothed vertical bar, i, chain, k, and lever, l, constructed and operating substantially as herein shown and described.

Second, The scoop, E, when provided with a concave cutting edge to prevent the bursting of the hill, in combination with the wings, G, as set forth.

Third, The vibrating riddle, F, consisting of bent sheet metal bars, which are so arranged that the ends of the center bars drag on the ground, and those of the outer bars are elevated above the ground, substantially as and for the purpose herein shown and described, in combination with the mold boards, H and I, substantially as herein set forth.

Fourth, The mold boards, H and I, when arranged as herein described, in combination with the wings, G, and scoop, E, all made and operating substantially as and for the purpose herein shown and described.

Fifth, Extending the sides or wings, G, beyond the bottom of the scoop, E, substantially as and for the purpose herein shown and described.

64,115.—SEAT FOR LOUNGES AND CHAIRS.—M. Le Page and F. Raymond, Woodhaven, N. Y.

We claim the strip, C, curved on its profile in the arc of an ellipse, in combination with the rebate, a, curved in the arc of a circle for clamping the ends of the spring, B, substantially as and operating in the manner set forth.

64,116.—SAD IRON.—Elliot Lewis, Lockport, N. Y.

I claim the detachable handle, E, provided with feet, g, and slide bolt, h, in combination with the way, b, cross wifes, c c, and bolt socket, d, arranged and operating substantially as set forth.

64,117.—TOY.—William E. Lincoln, Providence, R. I., assignor to Milton Bradley & Co., Springfield, Mass.

First, I claim the device herein described, consisting of the revolving cylinder, A, with any number of slits, a b c d e, and having figures upon its inside surface, and arranged and constructed substantially as set forth.

Second, The plate, F, having any desired figures upon it, arranged in the manner and for the purpose described.

Third, The plate, B, upon the bottom of the cylinder, having any desired figure or figures upon it, formed substantially in the manner and for the purpose set forth.

64,118.—HAND SAW.—William H. Livingston, Johnstown, N. Y.

First, I claim connecting the metallic back of a frame saw to the handle, by passing the frame into a hole in the handle, substantially as specified.

Second, I claim attaching the metallic tightening buckle, d, to the lower edge of the wooden handle, a, in the manner set forth.

Third, I claim a metallic tightening buckle, formed with a slot for the reception of the end of the saw, a hole for the screw rod, i, and a nut to screw upon the rod, c, as set forth.

Fourth, I claim the stiffener plate, c', and the rod, c, forming the frame of the saw, as and for the purposes set forth.

64,119.—CULTIVATOR.—Michael F. Lowth and Thomas J. Howe, Owatonna, Minn.

First, We claim the combination with the quadrant, J, of the adjustable segment, M, for the purpose of changing the position of the lever, N, substantially as and for the object specified.

Second, The combination of the quadrants, J J', segments, M, shaft, K, and lever, N, with the chains or flexible connections, I, connecting bar, H, and shovel beams, D, all arranged and operating in the manner and for the purpose specified.

64,120.—WAGON-SEAT SUPPORTER.—John Lunger, Waldo, Ohio.

claim the standard, B, constructed substantially in the manner set forth, d used as and for the purpose specified.

64,121.—COMBINATION TOOL.—John Lyle, Newark, N. J.

First, I claim the U-shaped jaw, A, in combination with two movable jaws, B C, and handles, D E, constructed and operating substantially as and for the purpose described.

Second, The stop, f, in combination with the U-shaped jaw, A, and movable jaws, B C, constructed and operating substantially as and for the purpose set forth.

64,122.—WASHING MACHINE.—Andrew J. Mapes, Independence, Mo.

First, I claim the buoyant or floating rubber board, B, constructed substantially as herein shown and described and for the purpose set forth.

Second, The combination of the large wheel, C, and small wheel, E, with each other and with the rubber board, B, box, A, and frame, D, of the machine, substantially as herein shown and described and for the purpose set forth.

Third, The combination of the long levers, I, pitmans, J, pulleys, K and L, and bands, M, with each other and with the wheels, C and E, and frame, D, of the machine, substantially as herein shown and described, and for the purpose set forth.

64,123.—VESSEL FOR STORING AND TRANSPORTING OIL.—Thomas J. McGarry, Cleveland, Ohio.

First, I claim the tank, A, with shell and lining, B, having a water chamber at the sides and ends, in combination with inlets and outlets, arranged as and for the purpose substantially as set forth.

Second, Hanging the tank upon journals or bearings, as and for the purpose set forth.

Third, The saddles, N, provided with spring bearings, in combination with the tank, substantially as and for the purpose set forth.

64,124.—RAILWAY SWITCH.—James McLaughlin, Duncannon, Pa.

I cla m the movable elastic frog continuous with and forming part of the adjoining rails, C C, their conveying slotted ends joined together in the slotted chair, G, by means of the bolt, F, their elastic or disengaged portion connected together by means of the cross rod, d, in combination with the main rails, A A, branch rails, B B, and operated by means of the crank, e, and sliding bar, I, substantially as herein shown and described and for the purpose speci ed.

64,125.—PAINT OIL.—Samuel Melsom, Erie, Pa.

I claim the paint oil composed of linseed oil, benzine, rosin, and the paint dryer, in the proportions substantially as set forth, and prepared as described.

64,126.—PAVEMENT.—Benjamin F. Miller, New York City.

I claim a pavement formed of blocks laid at an inclination, so that one block lies partially upon the side of the next, substantially as set forth.

64,127.—LOOM.—Charles Miller, St. Louis, Mo. Antedated April 10, 1867.

First, I claim the combination of the short shaft, B2, the crank, b, and rod, b', when the whole are arranged in connection with the lay frame, in the manner and for the purpose described.

Second, I claim the combination and arrangement of the shifting bar, D, and its stops, d, and the picking sticks, C'.

Third, I claim the ratchet, E, and its star-shaped groove, e, for the purpose of giving the required motion to the shifting bar.

Fourth, I claim the combination of the ratchet, E, and the lever, E3, substantially as described and for the purpose set forth.

Fifth, I claim the combination and arrangement of the twill governor, composed of the devices, F2 F3 F4, F5 F6 f3 f4 f5 f6 and f7, substantially as described and set forth.

64,128.—CHIMNEY OR VENTILATOR.—Joseph A. Miller, New York City.

I claim the smoke stack, A, provided with annular inclined planes, B C, having different inclinations, leaving a space divided into compartments by the radiating partitions, D, constructed and operating as and for the purpose specified.

64,129.—CLOTHES DRYER.—A. J. Mills and E. M. Hewett, Scott, N. Y.

We claim the within-described dryer composed of the plate, A', with its flanges, and the pivoted slats, B B, the same being used substantially as and for the purpose specified.

64,130.—OILING DEVICE FOR JOURNAL BOXES.—George M. Morris, Cohoes, N. Y.

First, I claim forming inclined shoulders, D, and the oil chamber or reservoir, C, of the journal box, substantially as herein shown and described and for the purpose set forth.

Second, The inclined removable slotted plate, E, in combination with the inclined shoulders, D, of the journal box, and with the oiling disk, F, substantially as herein shown and described and for the purpose set forth.

64,131.—APPARATUS FOR ROLLING CLEVICES AND PLOW SHARES.—Felix Murray, Pittsburg, Pa.

I claim the rolling or forming of clevices and shares for plows by means of the rollers, B B', provided respectively with the grooves, a b c and d, and arranged with a stripping or guide roller, D, to operate substantially in the manner as and for the purpose set forth.

64,132.—STEAM-ENGINE SLIDE VALVE.—George H. Myers, Philadelphia, Pa.

First, I claim the cavity, a, in the top of the valve, in combination with springs, d, packing piece, b, and a top plate, c, constructing and operating substantially as and for the purpose described.

Second, The slide, C, working on the outside of the steam chest, and provided with a pin, f, to catch in a socket in the valve, in combination with the top plate, c, and packing piece, b, constructed and operating substantially as and for the purpose set forth.

64,133.—FARM GATE.—J. H. Nonamaker, Middletown, Pa.

I claim the combination and arrangement of the grooved pulleys D and F, with the rear end of the gate A, and with the rails E and G, of the panel of the fence adjacent to the rear end of said gate, substantially as herein shown and described.

64,134.—LAND CONVEYANCE.—R. J. Nunn, Savannah, Ga.

I claim the grooved rollers B, and ribbed band C, in combination with the curved end frame A, bearing the working parts which communicate motion to the band constructed and applied as described for the purpose speci ed.

64,135.—COPPER COATED IRON ROLLS FOR PRINTING AND FINISHING.—Alfred Parof, Mulhouse, France.

I claim a new manufacture marking printing or finishing rollers of cast iron and coating the same with copper, substantially in the manner and by the means herein specified.

64,136.—STOVEPIPE DAMPER.—Ephraim Parker, Marlow, N. H.

I claim a damper made of two parallel plates or disks whose edges are cut away at opposite sides and to one of which is pivoted hinged or adjusted near the side thus cut away a valve or slide, the whole device constructed so as to operate substantially as described.

64,137.—QUILTING FRAME.—Benoni F. Partridge, Syracuse, N. Y.

I claim the combination and arrangement of the axis, the rollers, the extension bars, the legs, the set screws, the guides, the stay rods, the slot in the extension bars all constructed and operating substantially as and for the purpose shown and described.

64,138.—RAILROAD SWITCH.—H. E. Passmore and G. A. Heckert, York, Pa.

First, We claim the pointed spring rails C C, moving on the slide plates E, E, and lug plates F F, in combination with rails X X.

Second, The double notched guard rails D D, in connection with the pointed spring rails C C, to guard the wheels from striking the points of the said spring rails X X.

Third, The single lipped switch rod G, which allows the pointed spring rails C C, to move back in combination with spring rails, etc.

Fourth, The combination of the pointed spring rails C C, moving on the slide plates E E, the lug plates F F, and the single lipped switch rod G, in connection with the guard rails D D, in the manner and for the purpose herein substantially set forth.

64,139.—MANUFACTURE OF STARCH SUGAR.—Narcisse Pigeon Montreal, Canada.

First, I claim the within described process of manufacturing a crystallizable syrup from fecula, free from dextrine or nearly so substantially as herein set forth.

Second, The within described process of manufacturing a hard crystalized sugar from starch syrup prepared from fecula as above described substantially as herein set forth.

64,140.—GATE LATCH.—George M. D. Pomeroy, Attica, Ind.

I claim a gate latch consisting of the parts B C and D, constructed and arranged for use as described acting in combination with the pin A, substantially in the manner and for the purpose set forth.

64,141.—LANTERN.—William Porter and William Porter, Jr., New York, N. Y.

We claim the lower guard ring c, when made of sheet metal as described, so as to permit of a prolongation of the guard wires substantially as herein shown and set forth.

64,142.—BOTTOM FOR CULINARY STEAMERS.—W. S. Potwin, (assignor to Frank Sturges & Co.,) Chicago, Ill.

I claim the bottom of the steamer provided with the deep groove B, near its outer edge projecting downward and surrounding the raised centre which is provided with the raised concentric ribs A, whereby perforated concentric channels are formed by the steam condensed within the steamer from the articles being steamed, as herein shown and described.

64,143.—CORN PLANTER.—John B. Raines, Fremont, Iowa.

I claim the cut off represented, in the drawings by the letters A A A, and the dies represented by the letter J, and the bottom of the box in which the corn is placed represented by the letters A A.

64,144.—VALVE GEAR FOR WATER METERS AND OTHER PURPOSES.—John H. Rhodes, Brooklyn, N. Y.

I claim in a valve gear substantially of the character described, the combination with the rod H, and its roller d of the lever E, linked as described to said rod by a pin f, arranged to pass through an oblong or oval slot in the lever and the latter constructed at its outlet end i, for gear with the roller d, substantially as specified.

64,145.—HAT.—Celius E. Richards, North Attleboro, Mass.

I claim a hat fabricated of paper, thread or twine substantially as described as a new manufacture.

64,146.—GAME FOR PASTIME.—Charles Richardson, Richmond, Va.

I claim the arrangement of certain devices as herein before described and shown by the accompanying drawings for forming an instructive and amusing game, or pastime, for the house or field.

64,147.—LET-OFF FOR LOOMS.—George Richardson, Lowell, Mass.

First, I claim the combination and arrangement of the whip roll d, with its finger e, the lever f, tension spring h, friction pad m, and friction pulley g, of any form or shape, substantially as and for the purpose herein set forth.

Second, I claim the cam or pawl q, combination with the adjustable stand p r, and friction brake f, as and for the purpose herein described.

Third, I claim allowing the let-off at the time of the extension of the sheds of the warp by its action on the whip roll and completely stopping the let-off at the time of beating up the woof by means independent of the whip roll substantially as herein specified.

64,148.—MUSICAL RACK OR DESK.—Francis Xavier, Rizy, Monroe, Mich.

I claim the cross bars G, in combination with the clamping bars e, the inclined plane h, thumb screw f, slots p, spurs o, enlargements n, and also in combination with the other common devices, such as the foot board d, rack c, and instrument a.

64,149.—CHURN.—C. H. L. Roberts, Morrison, Ill.

First, I claim the arrangement of the shaft G, with its plates b b, and placed within the trough E, in the manner and for the purposes specified.

Second, The box A, with lid D1, having funnels S t, and covered opening x dasher shaft D, in combination with the trough E, all arranged and operating in the manner substantially as and for the purpose set forth.

64,150.—GATE.—Elias Roth and George Shane, New Oxford, Pa.

First, We claim the combination and arrangement of the bent levers H and I, and short bars K and L, with the gate B, ropes O and N, post A, substantially as herein shown and described and for the purpose set forth.

Second, Placing a roller D under the front cross bar b3 of the gate B substantially as herein shown and described and for the purpose set forth.

Third, The catch G E, constructed and arranged substantially as herein described and for the purpose set forth.

Fourth, Forming the horizontal bars b2 of the gate B, so that they may be oval in their cross section, and placing them with their longest diameter horizontal, substantially as herein shown and described and for the purpose set forth.

64,151.—COMPOUND FOR CURING FOOT-ROT IN SHEEP.—W. Russell and B. Carpenter, Northfield, and Joseph Drake, Boston, Ohio.

We claim the herein described compound applied as and for the purpose described.

64,152.—GANG PLOW.—E. Sexton, Munson, Mass.

First, I claim the adjustable bars, B, provided with the tubular guides or supports, F, for supporting the plows, substantially as shown.

Second, In combination with the laterally adjustable bars, B, I claim the spring rods, l, and levers, L and m, arranged to operate as set forth.

64,153.—GATE FASTENING.—Charles Seymour, La Porte, Ind.

I claim the bed plate, C, cap, A, sliding bar, B, thumb series, D D, and circular sock, E, constructed, arranged and operating substantially as herein set forth.

64,154.—MACHINE-KNITTED HOSIERY.—Benjamin F. Shaw, South Danvers, Mass.

I claim as a new article of manufacture, a machine-made stocking, hose, or sock, knit or formed in the manner set forth.

64,155.—SHOE FASTENING.—Gerard Sickels, Boston, Mass.

I claim a shoe fastening device constructed to operate substantially as set forth.

64,156.—APPARATUS FOR CARBURETTING GAS.—Warren A. Simonds, Boston, Mass.

First, I claim the arrangement within the vaporizing vessel of complete disks, f, and partial partitions, g, when combined with tubes, h, connecting the respective cells of each chamber, alternately with a cell of the chamber above and with a cell of the chamber below, substantially as and for the purpose described.

Second, I claim connecting the cells on different sides of the same disk by independent U-tubes exterior to the cylinder, adjusted, arranged, applied and operating substantially as described.

64,157.—MOUNTING GLAZIERS' DIAMONDS.—Philip Sinsz, Baltimore, Md.

I claim the within described glaziers diamond the same having the breaker, B, jointed or pivoted to the handle, A, and the diamond block swiveled to the breaker, substantially as and for the purpose set forth.

64,158.—METALLIC BOBBIN.—Charles T. Smith, Utica, N. Y.

I claim the securing of the wooden heads or flanges, b, on the non-corrosive metal tubes, a, of bobbins by drawing up a shoulder, c, on the tubes for the upper surfaces of the heads or flanges, b, to abut against and turning up the ends of the tubes. a, within a concave, d, substantially as shown and described.

64,159.—COFFIN.—Henry Smith, Jr. Summit, N. Y.

First, I claim the combination of the frame, C, prepared for the reception of a glass plate with the cover, B, of the coffin in such a manner that the upper side of said frame may be flush with the upper surface of the said cover, substantially as and for the purpose herein set forth.

64,160.—SASH FASTENER.—John R. Smith, Salem, assignor to himself and A. S. Rogers, South Borough, Mass.

First, I claim the combination with the shell, D, cast as described of the cam lever, E, and metal faced block, f, substantially as and for the purposes set forth.

Second, The combination with the shell, D, of the pivot, a, cast upon the inside of the block of shell, D, for the purpose stated.

64,161—PANTALOON GUARDS.—S. B. Smith, and E. Lindsley, Cleveland, Ohio.

We claim the metallic guard, A, constructed substantially as described in combination with the hooked buttons, C, in the manner and for the purpose set forth.

64,162.—SKID.—Seabury Sowle, New Albany, Ind.

I claim the skid herein described when composed and constructed as described, with its curved center, and connected by the hooks in the manner and for the purposes set forth.

64,163.—HORSE HAY FORK.—A. B. Sprout, Hughesville, Pa.

I claim the coniform points, f and g, provided with cutting edges, and shoulders or hooks, 6 and 7, constructed, arranged, and operating substantially as herein described and for the purpose set forth.

64,164.—HORSE HAY FORK.—Ole O. Storle, North Cape, assignor to himself and Percy B. Smith, Milwaukee, Wis.

I claim a horse hay fork when made with prongs, A, connecting rods, B, sleeve, C, shaft, D, and lock, E, in combination substantially as and for the purpose described.

64,165.—CULTIVATOR.—J. E. Tate, Columbia, Tenn.

First, I claim the adjustable scrapers, F, constructed as herein shown and described in combination with the bars, G, and frame, A, of the cultivator, substantially as and for the purpose set forth.

Second, The cotton coverer, L, constructed as herein shown and described in combination with the bars, F, and frame, A, of the cultivator, substantially as and for the purpose set forth.

64,166.—STEAM PUMP.—James Edward Thorpe (assignor to himself and W. J. F. Liddell), Erie, Pa.

I claim the supply cylinder, D, constructed and operating substantially as described, in combination with the pumping engine and the oscillating valve F, and chamber, E.

I claim the arrangement substantially as described for moving the steam valve and the piston of the supply cylinder.

64,167.—HORSE HAY FORK.—William H. T. Tomlin, Mullica Hill, N. J.

I claim a hay elevator consisting of the two forks, C, hinged to the cross bars, c, and connected by the toggle joint lever, f g, having the loop or guide, o, working in the vertical groove, t, of the slotted standard, A, substantially as shown and described.

64,168.—EXCAVATOR.—Israel D. Vandecar, Chicago, Ill.

First, I claim the combination and arrangement of the shovels, B, provided with the shanks, B', the levers, C, arms, a, and the post, A, when arranged and operating substantially as described.

Second, In combination with the shovels, B, provided with the shanks, B', the levers, C, arms, a, and post or center piece, A, I claim the connecting chains, D, hoisting rope, E', and dumping ropes, E, when all arranged and operating substantially as and for the purposes set forth.

64,169.—DREDGING MACHINE.—Israel D. Vandecar, Chicago, Ill.

First, I claim the combination and arrangement of the scoops, C D, handles or levers, E F, connecting chains, B, rod, R, hoisting rope, H, and plate, A, when constructed and operating substantially as and for the purposes specified.

Second, In combination with said scoops, handles or levers, connecting chains, rod, hoisting rope and plate, I claim the ropes or chains, G, when operating substantially as and for the purposes set forth.

Third, I claim the combination and arrangement of the plate, A, rod, R, provided with the shoulder, r, the catch plates, a, bent lever, d f, and cord, g, when constructed and operating substantially as herein speci ed.

64,170.—IRONING TABLE.—B. Van Gaasbeek, Mount Vernon, N. Y.

I claim the combination of the chamber, d, of the table, the pivoted ironing board and the folding leg, f, substantially as and for the purpose herein set forth.

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64,171.—FENCE GATE.—W. F. Veber, Perrysburg, Ohio.

I claim the gate, A, as constructed in combination with the joints or pivoted post, G, as and for the purpose set forth.

64,172.—CORPSE PRESERVING CASE.—Joseph S. Waterman, Roxbury, Mass.

I claim providing the ice chamber, B, with a yielding top or cover for the purpose set forth.

I also claim forming a passage from the corpse chamber to an ice chamber placed above it, substantially as and for the purpose specified.

64,173.—FOLDING CHAIR.—N. Waterman, Toledo, Ohio.

I claim the combination of the seat, G, and legs, B D, whereby the back legs, D, fold on the front legs, B, and the seat. G, passing through between the side pieces, C, above the round, I, fold on the hind legs, D, of the chair, substantially as described for the purpose specified.

64,174.—CHECK HOOK REIN HOLDER—David C. Watson, Manchester, N. H.

I claim the mode herein described to secure check reins in the hook, as shown by stem. C, pin, D, tube, B, tube, A, and spring, E, which may be made of wire or rubber.

64,175.—SPRING BED BOTTOM.—Dexter P. Webster and Hermon W. Ladd, Philadelphia, Pa.

First, We claim the detachable frame herein described, the same consisting of the side pieces, B, with dovetail brackets, C, and the cross pieces, D, with dovetail ends constructed and operating, substantially as and for the purpose specified.

Second, The plates, C, constructed as described, in combination with the cross pieces, D, substantially as and for the purpose specified.

Third, The removable sectional tubular cushions. G, applied to the coils of the springs, substantially as described for the purpose specified.

Fourth, The pendent hooks, a. constructed as described, in connection with the bed stead frame, A, supporting the slat-bearing frame, substantially as described for the purpose specified.

64,176.—MACHINE FOR SHAPING METALS.—Morris Wells, Williamsburg, N. Y.

First, I claim the combination of springs, d, with the cross bar supporting the clamp, G, substantially as and for the purpose described.

Second, The link, K, fitted closely between the cross head, J, and crank, L, and operating in combination with the die, F, and punch, I, substantially as and for the purpose set forth.

64,177.—SLEIGHS.—Nathaniel T. Whiting, Lawrence, Mass.

First, I claim the combination of the hollow cross bar, A, the slotted slide, B, and pin, E, when constructed and arranged to operate substantially as and for the purpose set forth.

Second, The combination of the slotted shaft irons, F, the springs, C, and slotted hooks, a1, a2, when arranged to operate substantially as and for the purpose set forth.

64,178.—ORE WASHER.—John Wicks, Greenland, Mich.

First, I claim the combination of the separator, B, slime pit, J, buddle, H and their connections, the sleves, c c c c, and hutch, K, all for the purposes and substantially as described.

Second, I also claim the walking beam, N, connecting rod, 3, in combination with the hutch, K, substantially as described.

Third, I claim the buddle, H, in combination with the slime pit, J, for the purposes described.

Fourth, I also claim the buddle, G, in combination with the hutch, K, substantially as described.

64,179.—ILLUSORY DECAPITATION.—James C. Withington, Brookline, Mass.

I claim the effigy composed of figures 1 and 2, constructed and arranged substantially as herein shown and described for the purposes specified.

64,180.—CLOTHES WRINGER.—John Young, Amsterdam, N. Y.

First, I claim the gear, F, when applied to the upper shaft, B, of clothes wringers in the manner herein shown and described and operating as set forth.

Second, I claim, in combination with the gear, F, the cone or center, g, and pin, d, arranged as described, when used in connection with a gear, C, as specified.

64,181.—METHOD OF SPRINKLING LIQUIDS IN REFINING SUGAR.—Helem Merrill, Brooklyn, N. Y.

I claim diffusing the water or other cleansing or bleaching agent in a finely divided state by means of a current of air or other elastic fluid, substantially as described.

64,182.—DISCHARGE FOR CENTRIFUGAL MACHINES.—Helem Merrill, Brooklyn, N. Y.

I claim the stationary and removal scrapers and receptacles. by which a centrifugal machine may be discharged when in motion, substantially as described.

64,183.—FEEDER FOR CENTRIFUGAL MACHINES.—Helem Merrill, Brooklyn, N. Y.

I claim a hopper constructed substantially as described for the purpose of delivering and distributing a uniform layer on the seive of a centrifugal machine, while in motion.

64,184.—SEWING MACHINE.—Monroe Stannard, Hartford, Conn.

First, I claim operating the feed wheel of a sewing machine by means substantially such as described, so that whilst it shall always, when in action, have the ordinary intermittent motion, it may, in addition, have, or not have, at the option of the operator, a positive rising or falling motion for each progressive action of the wheel, for the purpose set forth.

Second, The employment in a sewing machine of the adjustable vibrating lever, N, or its mechanical equivalent, with the rock shaft, P, arms, q s, connecting bar, r, cam, t, or their mechanical equivalents, for holding the feed wheel, and for giving to it an alternate rising and falling movement, substantially as described.

RE-ISSUES.

2,572.—CARRIAGE WHEEL.—John Raddin, Lynn, and George W. Chipman, Boston, Mass., assignees of John Raddin. Patented June 13, 1865.

We claim a wheel having combined directly with the spokes thereof elastic cushions or blocks of rubber so applied to or in the line of the spokes as to receive the strain exerted between the axle and the tire of the wheel, and having also means for relative adjustment of the spokes and cushions.

Also, The specific constructions described, and shown in the several spokes represented in figs. 1, 2, 3, 4, 5, and 6.

2,573.—GRATE BARS.—Lorenzo B. Tupper, New York City, assignee of Daniel Lasher. Patented Sept. 11, 1860.

First, I claim a furnace grate bar having a series of parallelogram openings running crosswise of the bar, substantially as set forth.

Second, A furnace grate bar in which the cross bars are alternately connected at their ends, substantially as set forth, to strengthen said cross bars and prevent the scraper dropping in between said bars, as set forth.

Third, A furnace grate bar in which the surface of the longitudinal bar is on the same level as the top of the cross bars, as set forth, so that said longitudinal bar will aid in supporting the scraper.

Fourth, Furnace grate bars in which there are longitudinal air spaces between the bars and parallelogram air spaces transversely of the bars, substantially as set forth.

2,574.—MACHINE FOR CUTTING HOOPS.—Martin Reed, Rochester, N. Y., assignee of John Thompson. Patented Nov. 17, 1863.

I claim, First, The combination of the irregular-shaped knife, D, with the automatically adjusting rest, C, and adjustable gage, b, as and for the purpose set forth.

Second, The employment of the knife, D, constructed with one or more offsets in its cutting edge, as described, and for the purpose set forth.

Third, The combination of the wheel, E, the spring pawl, d, and clutch, f, or their equivalents, with the rest, C, as and for the purpose set forth.

Fourth, I claim as an improvement in manufacture of hoops, the cutting of the hoop from the edge of the plank by a cut alternately in a bevel line and in a right line to the side of the plank, or in alternate bevel lines.

2,575.—COMPOSITION FOR ROOFING AND OTHER PURPOSES.—Rees B. Smith, Mount Pleasant, Ohio. Patented July 31, 1866.

I claim the composition, for roofing and other purposes, consisting of the ingredients in about the proportions described.

2,576.—BRACE FOR BITS.—N. Spofford, Haverhill, Mass. Patented Nov. 1, 1859.

I claim, First, A bit stock constructed with a tapered socket transverse to the arm or portion of the stock in which it is formed, and said arm slitted along its center line, so as to divide said socket lengthwise into two equal parts to form an expanding socket, substantially as and for the purpose described.

Second, The slitted socket, A, constructed with the inward projections or lips, d d, at its larger end to close over the shoulders of the bit shank for the purpose of retaining said shank with the socket when clamped substantially as set forth.

Third, Arranging the socket, A, of a brace with a slot, a, as described in combination with a thumb screw, D, and slips or projections, d, or their equivalents, substantially as and for the purpose set forth.

DESIGNS.

2,626.—CLOCK CASE.—A. C. Felton, Boston, Mass.

2,627.—TRADE MARK.—Louis L. Arnold, New York City.

2,628.—TRADE MARK.—Eli. W. Bailey, Philadelphia, Pa.

2,629.—TRADE MARK.—John M. Batchelder, Cambridge, Mass.

2,630.—TRADE MARK.—James P. Baxter, Portland, Me.

2,631.—TOBACCO BOX.—Charles J. Hauck, Brooklyn, N. Y.

2,632.—FENCE PANEL.—George Lovejoy, Deposit, N. Y.

Foreign Patents.

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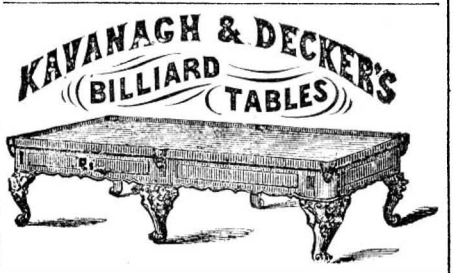

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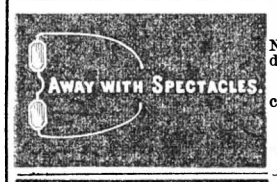

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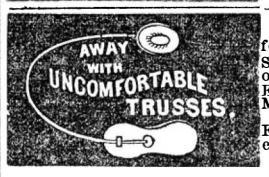

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All communications must be addressed "Combination Molding and Planing Machine Company, Post-office Box 2230, New York. All our machines are tested before delivery, and warranted.
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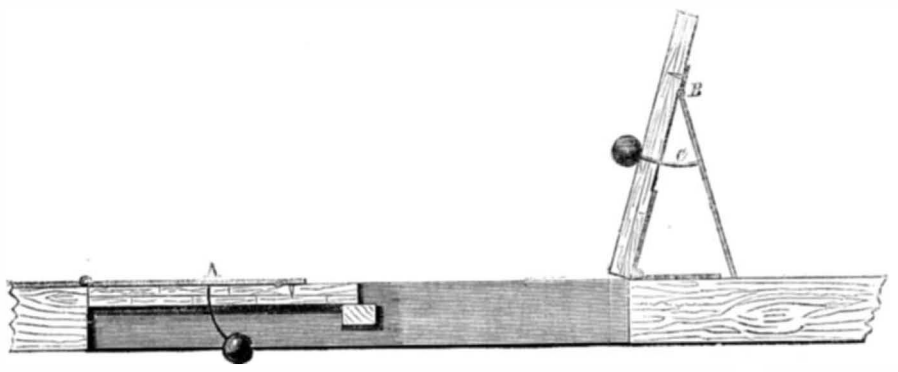
Improved Trap-door Attachment.

Severe bodily injury and even death not unfrequently occurs by the accidental falling through open trap doors in buildings and hatches in vessels. The engraving presents a simple contrivance designed to diminish the risks to such accidents and appears calculated to fully subserve that purpose. With this attachment the trap door is automatically braced firmly in a nearly upright position. At A, the trap is seen closed. It is hinged in the ordinary manner, but has, in addition, a bar pivoted to the door, as at B, which becomes a brace when the door is raised beyond a vertical position. In opening the trap, soon as it has passed a vertical position the weight of the pivoted brace swings it out from the door, aided by the rod, C, and stop or weight, D, which are firmly secured to the swinging bar. The rod, C, may be curved on a radius corresponding with its distance from the hinge of the bar so that but a small hole through the trap is necessary for its action. The weight may be arranged to slide on the rod to be secured at any point by a set screw, so that the door may be thrown back to any desired angle, or by pushing the bar in with the foot the trap may be laid flat on the floor or deck in the usual way.



BARTLETT'S TRAP-DOOR ATTACHMENT.

It will be seen that this contrivance is convenient in all situations, but particularly in opening a trap, as a roof scuttle, from a ladder. It will save the breaking of hinges so common by throwing the trap door back, and its upright position will naturally attract attention and prevent accident.

It was patented through the Scientific American Patent Agency by Samuel R. Bartlett, of Detroit, Mich., March 12, 1867. For particulars apply to Albert G. Boynton, Detroit, Mich.

Trial of a Heavy Gun.

At the experimental firing of the 20-inch gun at Fort Hamilton, March 15th, the charges used were, first shot, 125 lbs.: second shot, 150 lbs.: third shot, 175 lbs.: fourth shot, 200 lbs.: mammoth powder. This gun was fired at a constant angle of 25°. Gen. Rodman's pressure plug was used in getting the pressures. An examination of the record will show that from some unknown cause the amount of pressure of the third discharge exceeds that of the fourth, although 25 lbs. less powder was used. At the same time the range is 2,827 yards less. The same irregularity may be observed between the second and third shots. Future experiments may explain these variations. It would undoubtedly have been more rapidly loaded had the running gear been free from dirt and properly oiled. The dust from the parapet (recently made) will insinuate itself, and unless removed, soon form with the oil a mixture which, on the axle, seriously retards the working of the gun. The mean recoil was 5′ 10″, or less than half the length of the top carriage. Weight of shot, 1,080 lbs.

The following is the record of the firing :—

Calculated Ranges.—First shot, 6,110 yards, 3·47 miles; second shot, 6,802 yards, 3·86 miles; third shot, 6,770 yards, 3·85 miles; fourth shot, 7,952 yards, 4·52 miles. These ranges are obtained by computation.

By plotting, the Ranges are—First shot, 6,144 yards—difference, 34 yards second shot, 6,860 yards—difference, 58 yrrds; third shot, 6,828 yards—difference, 58 yards; fourth shot, 8,001 yards—difference, 49 yards.

Times of Flight.—First shot, 26 seconds; second shot, 26 seconds; third shot, 27 seconds; fourth shot, 27 seconds. Length of base line, 2,310 yards.

Pressures (Maximum).—First shot, 21,000 lbs. per square inch; second shot, 21,000 lbs. per square inch; third shot, 25,000 lbs. per square inch; fourth shot, 21,000 lbs. per square inch,

Recoils.—First shot, 8 feet (no sand); second shot, 85 inches (sanded); third shot, 10 inches from counter hurter (sanded); fourth shot, 7 feet 5½ inches (sanded).

Time of loading, running into battery, elevating, and priming, 8½ minutes. —*Army and Navy Journal.*

Wheels on Pavements.

One of our correspondents recommends for the preservation of pavements, wheels with large faces. He thinks there should be a law compelling every truck to have wheels of eight-inch face, and every stage and express wagon wheels of six-inch face. This would preserve the pavements and keep them level. He says he has three ox carts, two with wheels of six inches and one with wheels of eight inches of face, and his meadows are never cut up in ruts. One of these eight-inch wheels will outlast four of two-inch face, and the tires of three-eighths-inch iron never wear out. There should be no disk to these wide-faced wheels and no "gather." The spokes should be double.

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If the parties consulted are honorable men, the inventor may safely confide his ideas to them: they will advise whether the improvement is probably patentable, and will give him all the directions needful to protect his rights.

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All business committed to our care, and all consultations, are kept by us *secret and strictly confidential.* Address MUNN & CO., 37 Park Row, New York.

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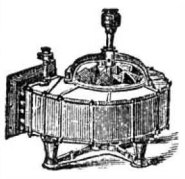

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My stream is a very light one, and everybody told me it was useless to try a Turbine in place of an Overshot with so little water. When the wheel came they all pronounced me a fool, or insane; that so small a wheel could not turn around, much less drive a millstone.

I told them to wait and see and they would change their tune. Some fifty men had come in to see me start up, and I wish you could have been here to hear their different opinions.

First I started up with one run of stone, and off she went like a thing of life, then after a little I put on two runs; off she went again, and has run beautifully ever since. They all gave it up, and pronounced it the most wonderful wheel they ever knew. The Turbine uses no more water than the Overshot did, and gives decidedly more power.

I am surprised at the accuracy of your calculations and statements as to the performance of your Turbine. My Confidence was not misplaced.

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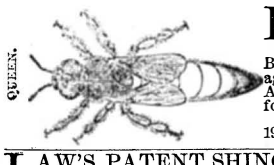

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